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THE BUILDER'S Cheſt-Book;

OR A Complete

KEY

TO THE

Five Orders of Columns

IN

ARCHITECTURE.

Where by way of Dialogue in Nine Lectures the Etymology, Characters, Proportions, Profiles, Ornaments, Meaſures and Diſpoſitions of the Members of their ſeveral Columns and Entablatures are diſtinctly conſider'd and explain'd with reſpect to the Practice of *Palladio*.

TOGETHER

With the manner of drawing the Geometrical Elevation of the Five Orders of Columns in Architecture, and to meaſure the ſeveral Parts of Buildings in general.

The whole exemplified by way of Dialogue, in a very conciſe and familiar manner, illuſtrated on ſeven Copper-Plates: Being a neceſſary Companion for Gentlemen, as well as Maſons, Carpenters, Joyners, Bricklayers, Plaſterers, Painters, *&c.* and all others concern'd in the ſeveral Parts of Buildings in general.

By B. LANGLEY *of Twickenham.*

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BRITISH MUSEUM
1 SEP 58

TO THE

RIGHT HONOURABLE

THE

Lord *PARKER*.

MY LORD,

THAT I take the Freedom to adorn this ſmall Work with Your Lordſhip's Name (whoſe Patronage alone can give it Reputation) I have no Excuſe for, but an Ambition of publickly declaring the great Eſteem I have ever had of Your Judgment, not only in the beautiful Proportions of Architecture, but through all the learned *Cycle* of the moſt uſeful Knowledge and abſtruſer Sciences, as well as the moſt polite and ſhining.

AND as the very Life of *Architecture* conſiſts in true Proportions, which are plainly exhibited in the following Lectures, under Your Lordſhip's Protection; I am confident, that thereby they cannot but find a very grateful and kind Reception in the World.

DEDICATION.

My Lord, The Subjects of the enſuing Lectures, are for the moſt part ſo excellent, that they would be worthy Your Lordſhip's Patronage, were they as well and as fully handled, as the Beauties of the Science deſerve. However, as nothing of this kind has been ever yet attempted in the manner here deliver'd; I therefore have laid the Foundation, and hope that ſome more able Pen, will carry up, and compleatly finiſh the whole Structure.

I humbly deſire Your Lordſhip, not to look upon the Value of the Offering, but upon the Deſign of the Offerer, which is to do the beſt Service I am able to my Country, and not be wanting in any dutiful Reſpect to Your Lordſhip. I am,

Your Lordſhip's,

moſt obedient

humble Servant,

BATTY LANGLEY.

THE
PREFACE
TO THE
READER.

THE following Diſcourſe by way of Dialogue, on the Proportions of the Five Orders of Columns in Architecture, being written for the Uſe of young Students, as well as for the Eaſe of thoſe who are ſomething advanced therein; I have therefore made choice of thoſe beautiful Proportions as were practis'd by that grand Architect *Palladio*.

The Meaſure by which I proportion their ſeveral Parts, is the Diameter of the Column at its Baſe, divided into ſixty equal Parts, each of which I call a Minute.

The Method of ſetting of the Projecture of the Parts of an Order from its upright, as practiſed by *Palladio*, I do not follow; it being more difficult to the young Student, than to ſet them from the Centeral Line of the Column, including the Semidiameter thereof.

The Diameter of a Column divided, as aforeſaid, I call a Module, and uſe it as ſuch throughout the Five Orders in general.

The following Diſcourſe conſiſts of Nine Lectures of Architecture, wherein are very conciſely and familiarly exhibited, the ſeveral Parts of a Building. The Etymology, Characters, Proportions, Ornaments and Diſpoſitions of the ſeveral Orders.

The ſeveral Parts relating to Materials and Buildings in general, are digeſted into ſuch a manner, as they ought to be read by every Student herein.

And although this ſmall Tract does not comprehend all the moſt uſeful Parts of Architecture, as perhaps it might have been expected to have done. Yet there is not any one thing omitted, as is neceſſary to a young Student at his firſt ſetting out.

As to the other more important Parts, I ſhall communicate them, when my young Student is well acquainted with theſe Rudiments, or firſt and moſt neceſſary Principles of Architecture, which ought to be often read and practiſed before he proceeds any further. For indeed the chief Motives of compiling this ſmall Diſcourſe were; for the Improvement of youth, who at preſent if ſtrictly obſerved, are for the greateſt part very ignorant of true Proportions, that are the Fundamentals and very Life of Architecture.

And that what I aſſert, may not appear as an Untruth, let any one as have Judgment herein, but obſerve the many prepoſterous Structures carrying on, and executed every Day, and very often at a much greater Expence to the Builder or Maſter, than if they had been truly perform'd, according to the beautiful Proportions of Architecture. 'Tis very obſervable, that moſt of our young Men of the building Trade, have more occaſion to be bound Apprentice when they have before ſerved Seven Years, and are out of their Time, than when they were firſt put Apprentice, the Seven Years before. For 'tis very rarely ſeen, that few or any of them know more than Jobing-work, and have heard of *Palladio*, *Scamozzi*, &c. but know nothing of their Orders.

This very great Ignorance among Workmen, is a great Prejudice to every one as employs them, as well as a great Shame either to them, or their Maſters to whom they were bound.

And as there is nothing ſo commendable in Youth, as being ingenious and good Workmen, and nothing ſo deſpiſeable as Blockheads and bad Workmen; 'tis therefore that I endeavour to explain the Beauties of Architecture, which will enable them to be of much greater ſervice to themſelves and Families, as well as the Commonwealth in general.

In the putting young Men to Maſters, there ought to be a very great Regard had to their Abilities, for when an ingenious Boy is bound to a Blockhead, who has the good Fortune to have great plenty of indifferent common Buſineſs, his Taſte and Genius to the Trade is often ruin'd.

Therefore I adviſe that all Parents have a very great regard to the Character and Knowledge of the Maſters, to whom they bind their Children; and that they do alſo covenant, that they be carefully and truly taught the Proportions and manner of working the Five Order of Columns in Architecture, applied to Practice in all ſuch parts of a Building as their Trades doth belong to.

And although this Advice will be rejected by ſome; yet for the general part, and eſpecially the wiſe, to whom I write, will commend and practice it, who in the End will find very great Advantages thereby.

To conſider of the many Treatiſes of Architecture as have been written by *Vitruvius*, *Palladio*, *Scamozzi*, *Serlio*, *Vignola*, and many other famous Architects compriz'd in *my Practical Geometry and Architecture*, would ſeem, that what follows them, would be needleſs: But notwithſtanding that may be a general Opinion, yet 'tis very plain that their Rules and Proportions being here explain'd in a manner more intelligible than that by them exhibited, 'twill prove a very great help to the young Student, and ripen his Underſtanding therein much ſooner, than when he reads their Rules; that are laid down after a very intricate (inſtead of an eaſy) manner.

And as my Deſign is to go through all the ſeveral parts of Architecture in general, both Theorical and Practical, with Additions thereunto, in Lectures of this kind by way of Dialogue between Maſter and Apprentice: 'Tis therefore that I again admoniſh you to well conſider the enſuing Lectures, before you proceed to thoſe that I ſhall hereafter communicate.

Twickenham
May 8. 1727.

B. LANGLEY.

LECTURES OF ARCHITECTURE.

LECTURE I.

M. *WHAT is an Architect?*

P. A Perſon Skilful in the Art of Building.

M. How many principal Parts is Architecture divided into?

P. Three. Civil, Naval, and Military.

M. What is civil Architecture?

P. The Art of Building dwelling Houſes, commodious Habitations, Publick Edifices, &c.

M. What is Naval Architecture ?

P. The Art of Building Ships and other Veſſels for War, Commerce, &c.

M. What is Military Architecture ?

P. The Art of Building Fortifications, or Buildings of Defence.

M. How many Conditions doth well Building conſiſt of ?

P. Three. Commodity, Firmneſs and Delight.

M. What are the moſt Commodious Geometrical Figures for Plans of Buildings ?

P. The Geometrical Square and Parallellogram.

M. Is not the Triangle, Pentagon, Hexagon, &c. as proper Figures for Plans as the Preceding ?

P. No. Except for Military Buildings, where the Baſtions are laid out at the Angles, and the Sides ſerve for Curtains.

M. Why is the Triangle, Pentagon, Hexagon, &c. improper Plans for Civil Architecture ?

P. For two Reaſons. Firſt, Becauſe that a right Angle is the ſtrongeſt Angle as can be made, of which the Triangle, Pentagon, &c. hath not any. But are either Acute or Obtuſe angled, and therefore much weaker in their Bondage.

Secondly, On Account of the ſeveral Inconveniences as attend thoſe Forms, in reſpect to Light, irregular Rooms, Vacuities, &c.

M. Is therefore the ſeveral Polygons to be wholly excluded in Civil Architecture?

P. No. (and in Particular the Octagon) When applied to ſingle Rooms for Banqueting, &c. Such as that Grand Octagon Room of the Honourable *James Johnſon* at his Seat in *Twickenham.* Thoſe Polygons then are very Beautiful and Grand.

M. What is the Reaſon why the Circle is not made uſe of in private Buildings.

P. Becauſe the circular Buildings are moſt chargeable, and much Room is loſt by the Curvature of the Walls.

M. In what Kind of Buildings is the Circle to be uſed?

P. In Cathedrals, Temples, Ampitheatres, &c.

M. Which of the preceding Geometrical Figures is the moſt commodious for Private Buildings ?

P. The Paralellogram.

M. What Proportion is beſt for ſuch a Paralellogram ?

P. That the Depth conſiſt of two Thirds of its Length, and thereby the Aſpect will be Grand and not diminiſhed.

M. Under how many Heads may all the Parts of every Fabrick be comprized ?

P. Five as Following. The Foundation, the Walls, the Appertions or Overtures, the Compartitions and the Roof or Cover.

M. What Method is to be taken in the Foundations of Buildings ?

P. That they are perfectly Sound and truly Level.

M. What Thickneſs is neceſſary for the Foundation of Buildings in general ?

P. At leaſt double to the Dependant Wall.

M. How many Kinds of Walls are in a Building ?

P. Two. The one entire and continual, the other intermitted.

M. What are the Intermiſſions ?

P. Columns, Pillaſters or Both.

M. What is moſt neceſſary to be obſerved in the Building of Walls?

P. That the Materials be good, that the moſt Heavy be laid at Bottom, that they diminiſh in thickneſs proportionable to their Height, that they be exactly Perpendicular, and that the Angles be firmly bound by Ruſticks or Pillaſters of Stone or Brick.

M. You was before ſaying that the Intermiſſions of Walls are Columns or Pillaſters; What is a Column?

P. A Column is a Kind of a round Pillar (compoſed of three Parts, viz. its Baſe, Shaft and Capital) uſed in Buildings for the Support of Entablatures, according to its reſpective Order.

M. What is an Entablature?

P. An Ornament (ſaith *Vitruvius & Vignola*) conſiſting of the Architrave, Freeze and Cornice of any Order.

M. What is a Pillaſter.

P. A Pillaſter is a Kind of a ſquare Pillar, having its Baſe and Capital as the Column in every reſpect, but doth not diminiſh upwards as a Column doth, and is different in all the Orders.

M. How many Orders are in Civil Architecture?

P. Five. Of which three are Greek and two Latin.

M. What are the Greek Orders?

P. The Dorick, Ionick and Corinthian.

M. What are the Latin Orders?

P. The Tuſcan and the Compoſite.

M. Is not there more Orders than the preceding five?

P. Yes. The Attick, the Perſian and the Caryatides.

M. What is the Attick Order?

P. An Order conſiſting of Pillaſters with a Cornice Architrived only for its Entablature.

M. What is the Perſian Order?

P. The Perſian Order is that which hath Slaves placed to ſupport the Entablature inſtead of Columns.

M. What is the Caryatic Order?

P. The ſame as the preceding, excepting that Women as placed, as aforeſaid, inſtead of Men.

M. In what Parts of a Building are Pillaſters uſed?

P. To ſupport the Entablatures as before is ſaid of Columns, ſtanding ſometimes free and detached from the Wall. But moſt commonly contiguous to it, or within it, ſo as not to ſhew more than one fourth or fifth Part of its Side.

M. What are the principal Parts of an entire Order?

P. The Pedeſtal, Column and Entablature.

M. What are the Parts of a Pedeſtal?

P. The Baſe, the Die or Trunck, and the Cornice.

M. What are the Parts of a Column?

P. The Baſe, Shaft, and Capital.

M. What are the Parts of an Entablature?

P. The Architrave, Freeze and Cornice.

LECTURE II.

Of the TUSCAN *Order.*

M. *WHY is the Tuſcan Order ſo called.*

P. Becauſe that the Aſiatick Lidians, who are ſaid to have firſt peopl'd *Italy*, brought it into that Part call'd *Tuſcany*, whence the Name derived.

M. What is the principal Character of the Tuſcan Order?

P. Simplicity, in reſpect to its native plainneſs.

M. In what Buildings is this Order to be uſed?

P. Where Strength and Solidity is required, as Ampitheatres, Gates, Magazines, Priſons, Bridges, &c. and for illuſtrious and majeſtic Decorations, as the *Trojans* and *Antoninus* columns at *Rome*, and that of *Theodoſius* at *Conſtantinople.*

Tuscan Order.

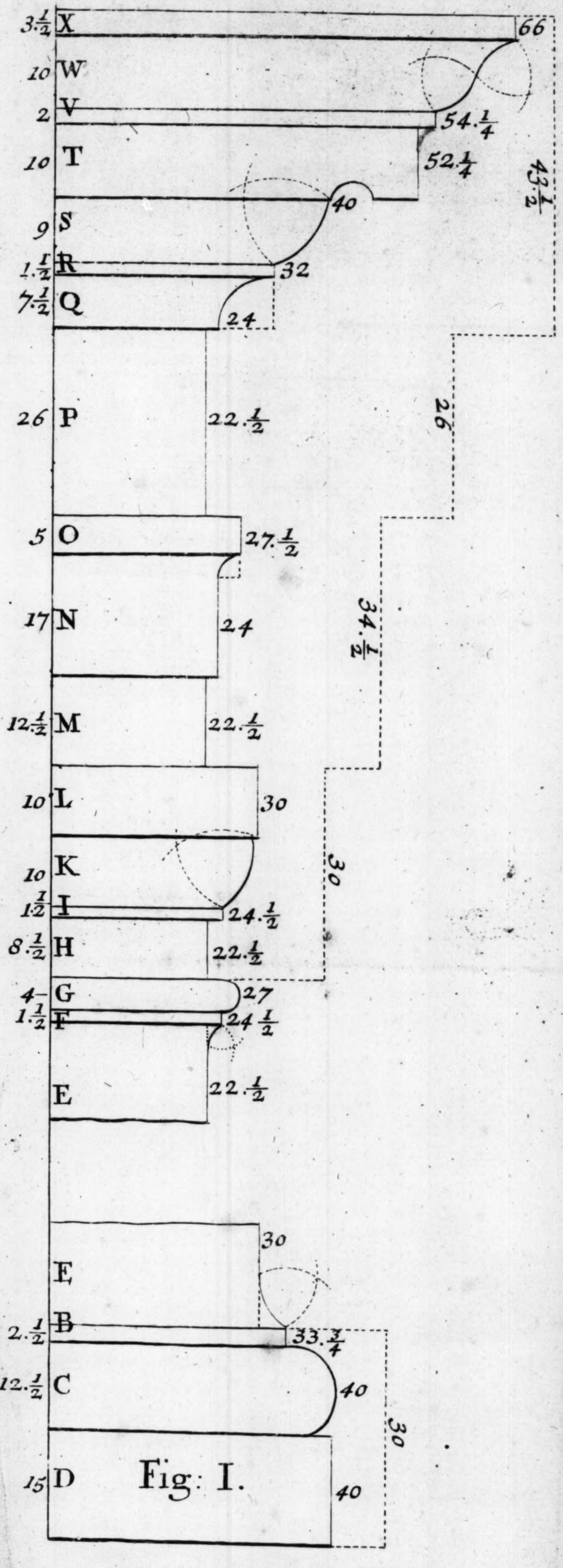


Fig: I.

M. In the preceding Lecture you demonſtrated to me that every Order is compoſed of three principal Parts, and every of thoſe Parts, of three others, &c. And I finding that every of thoſe reſpective Parts are compos'd of divers Members, I deſire that you demonſtrate the Number and Name of every Member reſpectively?

P. I will. And in order thereto, ſhall, throughout the whole Demonſtrations, make uſe of the ſeveral Orders, as laid down by *Palladio.*

M. How many Parts are in the Tuſcan Pedeſtal?

P. One only, viz. the Zoccolo, or Die.

M. How came it to paſs that Palladio did not give a Baſe and Capital to his Tuſcan Pedeſtal?

P. That thereby it might be the moſt plain and rural.

M. How many Parts are in the Baſe of the Tuſcan Column?

P. Three, viz. the Cincture B, the Torus C, and the Plinth D.

M. Is the Cincture of the Baſe of all or any of the other Orders included in the Baſe?

P. No, never but in the Tuſcan Order.

M. What are the Parts of the Tuſcan Column?

P. The Shaft E, and Capital I, K, L.

M. How many Parts are in the Shaft?

P. Two, viz. the Body E, and the Aſtragal F G.

M. How many Parts are in the Capital?

P. Three, viz. the Abacus L, the Ovolo or Echinus K, the Annulet I, and the Hypotrachelium or Freeze H.

M. What are the Parts of the Entablature?

P. The Architrave Freeze and Cornice.

M. How many Parts or Members are in the Architrave?

P. Three, viz. M, N, two Facia's, and the Fillet O.

M. How many Parts or Members are in the Cornice?

P. Seven, viz. the Liſt or Fillet X, the Cima Recta W, the Regula V, the Corona T, the Ovolo S, the Fillet R, and the Cavetto Q.

M. I obſerve that every Member has its particular Name, pray demonſtrate the true Expoſition of each?

P. I will, and in order thereto, will begin at the Pedeſtal, and proceed upwards, demonſtrating every Member in its Place.

1. (The) ZOCCOLO, A (from the Italian) a ſquare Body placed for the Support of Statues, Vaſes, &c.

2. (D the) PLINTH from the Greek *Plinthos*, a ſquare Brick or Table placed under the Mouldings of the Baſe of a Column, Pedeſtal, &c.

3. (C the) TORUS from the Greek *Toros*, a Cable which its Swelling ſomething reſembles, or rather from the Latin *Torus*, a Bed.

4. (B the) CINCTURE, a Fillet or Liſt at the Bottom of the Column, from the Italian *Liſtello*, a Girdle.

5. (E the) SHAFT or *Fuſt*, from the Latin *Faſtis* a Club, which *Vitruvius* called *Scapus*, is that Part which is comprehended between the Cincture B, and Fillet F.

6. (G the) ASTRAGAL from the Greek, *Aſtragalos*, the Bone of the Heel, 'tis that round Moulding or Coller as encompaſſes the upper Part of the Shaft. The Italians call it *Tondino*, being 'tis like a Torus.

7. (H the) HYPOTRACHELIUM, from the Greek, denoting the Neck of the Co-

lumn, 'tis a Kind of a Freeze to the Capital, and by ſome called the Collar.

8. (I the) ANNULET or Ring placed under K, the *Ovolo* or *Echinus*, a Greek Word ſignifying the Shell of a Cheſnut, called by moſt Workmen *quarter round*, 'tis oftentimes enriched with a carved Ornament, of Eggs or Hearts, with Darts between, ſymbolizing Love, &c. as in the Capital of the Trajans Column at Rome.

9. (L the) ABACUS, from the Greek Word *Abax*, ſignifying in Architecture that ſquare Piece, which crowns the Capitals of Columns as L.

10. M and N, FACIA's or *Faſcia*'s, or as ſome call it *Faſce*'s from the Latin Word *Faſcia*, a large Turban. 'Tis the Band of an Architrave, &c. which when divided into two Facia's, as herein, the lowermoſt muſt ever be the narroweſt, and the uppermoſt to finiſh with a Cymatium inverted, or a Fillet as O.

11. (P the) FREEZE, from the Latin *Phrygio*, an Embroiderer, or from the Italian *Freggio*, a fring'd or embroider'd Belt. 'Tis that Member as ſeparates the Architrave from

the Cornice, which in all the Orders, the *Tuſcan* excepted, is commonly adorn'd with divers Enrichments, as the *Dorick* with its Triglyphs. The *Ionick* with its Feſtoons, &c. Sometimes the Freeze is called *Zophoros*, from the Greek *Zoophoros*, it being uſually enriched with the Repreſentations of Animals.

12. (Q the) CAVETTO, from the Latin *Cavus*, a Hollow, being the 4th of a Circle.

13. The LIST or *Fillet* R, and *Ovolo* S, are already explained in the 8th Article hereof.

14. (T the) CORONA by ſome called *Supercilium*, or rather *Stillicidium* the Drip. 'Tis a conſiderable Member being not only as 'twere a Crown to the Whole, but defends all the reſt of the Edifice from Rain, bad Weather, &c. and therefore has its Projecture proportionably. The inward and outward Curvature of an Arch, Vault, &c. is alſo called Corona. The under Part of Corona's are called *Planceres*, and by the Italians, *Soffito*, generally enriched with *Modilions*, and between them *Roſes, Pomgranates*, *Fretts*, &c.

15. (V the) REGULA called alſo *Liſtello*, *Cincta*, &c. is a Member which ſeparates the *Corona* and *Cima Recta* W.

16. (W the) CIMA RECTA, or *Cymaiſe*, from the Greek *Kymation* a wave, called by Engliſh Workmen *Ogee*, which is of two Kinds, viz. *Cima Recta*, called by Workmen the *fore Ogee*, as W, and *Cima Reverſe*, or the *Back Ogee*, whoſe Beauty conſiſts in having its Height and Projecture equal to each other.

M. Theſe Parts thus explain'd I well underſtand; I now deſire that you, in the like manner, explicate the principal Parts of a Column, as the Pedeſtal, Column and Entablature.

P. Firſt (as before is ſaid at the latter End of the Lecture 1.) a Pedeſtal is compoſed of three Parts, viz. its *Baſe*, *Die* or *Trunk*, and the *Cornice* ; 'tis a ſquare Body ſerving as a Foot for the Column to ſtand upon, whoſe height, according to *Vignola*, is one third Part of the Height of its Column. Pedeſtals differ in different Order, and are ſometimes called *Stereobate* or *Stylobatæ*, from the Greek *Stylobates*, the Baſe of a Column.

Secondly, COLUMN, from the Latin *Columna* a Support, is divided into its *Baſe*, *Shaft* and *Capital* (as is ſaid before) the Baſe of a Column (from the Greek *Baſis*, a Reſt or Support) is that art as bears up the Shaft, as DCB taken together. The *Capital* of a Column is the upper Part thereof, from the Latin *Capitellum*, the Head or Top; and is that part on which the Architrave is placed, as G, H, I, K, L, Fig. II. Such Capitals as have no Ornaments, as the *Tuſcan* and *Dorick*, are call'd *Capitals with Mouldings*; and the other as the *Ionick*, *Corinthian*, and *Compoſite*; *Capitals with Sculptures*.

Laſtly, ENTABLATURE from the Latin *Tabulatum* a Ceiling. For originally the *Freeze* was formed by the Ends of the Joiſt, as reſted upon the Architrave, which is the principal Beam and firſt Member of the Entablature, as bears upon the Capital of the Column, as M, N, O. Fig. I. and M, N, of Fig. II. &c. The Word is from the Greek, *Archos*, *Chief*, and Latin, *Trabs*, a Beam. By ſome Architects 'tis called *Epiſtyle* (Greek) *Epi*, upon, and *Stylos* a Column. The

Freeze is already explained, and therefore ſhall proceed to the Cornice (from the Latin, *Coronis* a Crowning) the third and uppermoſt part of the Entablature, as Q, R, S, T, V and W. Fig. I.

M. By what Meaſure is the Parts of a Column meaſured ?

P. The Diameter of the Column at its Baſe divided into 60 equal Parts, called *Minutes*, and the whole Diameter, ſo divided, is called a *Module*.

M. How many Modules in height is contained in the Tuſcan Column and its Entablature ?

P. The Height of the *Tuſcan Column* excluſive of its *Baſe and capital*, is ſix Modules, and with them ſeven, each being equal to half a Module, and the *Height of the Entablature*, is equal to one fourth of the *Column* including the *Baſe* and *Capital*.

M. What Diminution hath the Shaft of the Tuſcan Column ?

P. Fifteen Minutes, or one fourth Part of its Diameter at the Baſe ?

M. Is the Tuſcan Column ever fluted as others are ?

P. No. Its native plainneſs ſtrictly forbids it.

M. What is the INTERCOLUMNATION of Columns?

P. INTERCOLUMNATION, from Latin *Intercolumnium*, is the Diſtance between two *Columns*, which in the *Dorick* Order is regulated according to the Nature of its Ornaments in the *Freeze*; but in the *Tuſcan*, *Ionick*, *Corinthian* and *Compoſite* Orders, the *Intercolumnation* is of five different Kinds, as

Firſt, ARÆOSTYLE, from the Greek, *Aracos*, rare, and *Stylos*, a Column; by which *Vitruvius* ſignified the greateſt Diſtance which can be made between the *Columns*, conſiſting of four *Modules* or Diameters of the the *Column*, belonging chiefly to the *Tuſcan* Order, to be practiſed at the Entrance of *Cities*, *Forts*, &c.

Secondly, DIASTYLOS, from the Greek *Dia*, between, and *Stylos*, *Column*, an *Intercolumnation* of three Diameters, moſt natural to the *Dorick*, and of four to the *Ionick*, to be uſed for Gates, Galleries, Porches, Frontiſpieces, &c.

Thirdly, SYSTYLOS, called *Pienoſtyle*, thick of Pillars, an *Intercolumnation*, as doth not exceed one Diameter and half, belonging chiefly to the *Compoſite*, to be uſed before Temples and other magnificent Works.

Fourthly, EUSTYLOS, from the Greek *Eus*, well, and *Stylos*, a *Column*, an *Intercolumnation* of two Diameters or very little more, proper for the *Ionick* and *Corinthian*, being of all other the moſt graceful. *Vitruvius* allowed this *Intercolumnation* two Diameters and a quarter, maintaining it to be the beſt Manner of placing *Columns* with regard to their Diſtance.

Dorick Order.

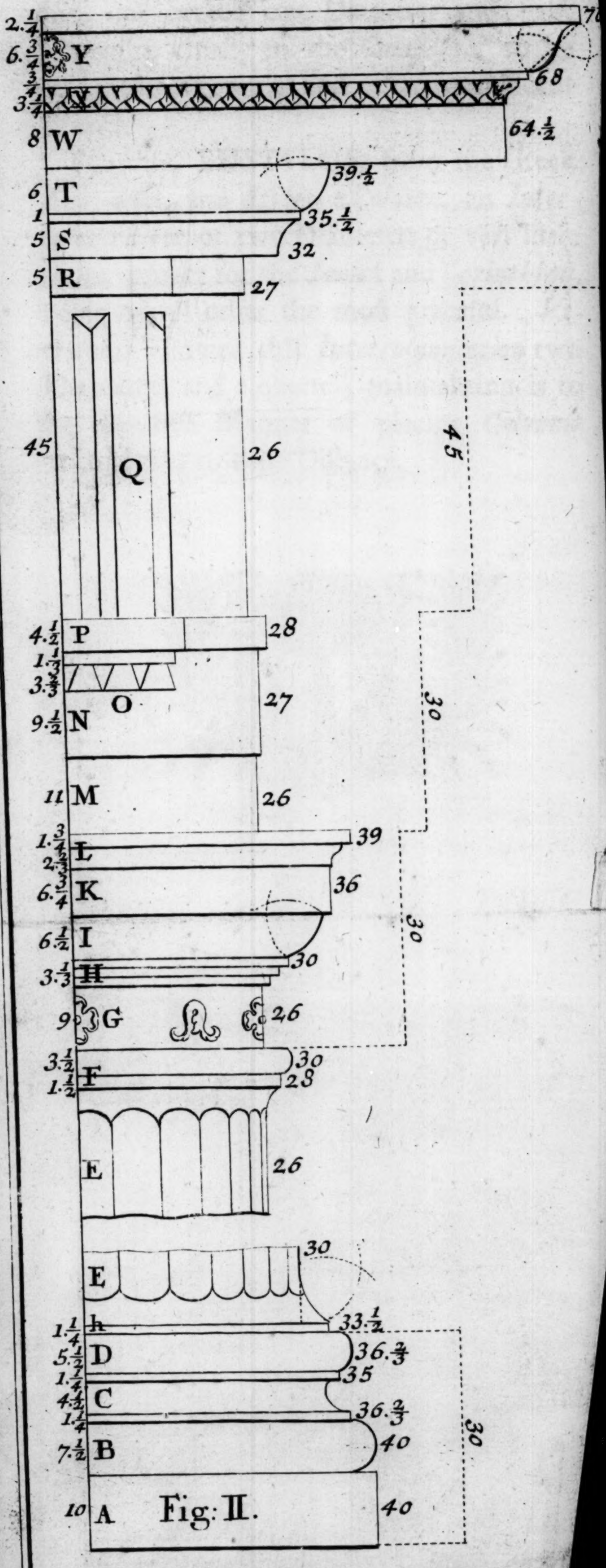


Fig: II.

LECTURE III.

Of the Dorick *Order.*

M. *WHY is the Dorick Order ſo called?*

P. Becauſe that *Dorus*, King of *Achaſis*, built a magnificent Temple to the Goddeſs *Juno*, in the City of *Argos*, which, *Vitruvius* ſaith, was the very firſt Model of this Order.

M. What is the principal Character of this Order?

P. Solidity and Beauty.

M. In what Buildings is this Order to be uſed?

P. Where Strength and Grandeur is required as in Ports of Citadels, outſide of Temples, Churches, Theatres, Triumphant Arches, &c.

M. Is there not a particular Method to be obſerved in this and all other Orders, to make them appear grand and noble?

P. Yes. By obſerving that the Diviſion of the principal Parts of the Order, conſiſt but of few Members, and thereby they will be grand and of a noble Aſpect.

M. Why hath few and large Mouldings a better Aſpect or Effect in Maſſy Buildings, than when they are many and ſmall?

P. Becauſe that ſmall Ornaments do divide and ſcatter the Angles of Sight in ſo many Rays preſſed together, that the whole appears but a Confuſion.

M. What were the ancient principal Parts of this Order?

P. Two only, viz. the *Column* and *Entablature.*

M. Had not this Order anciently a Pedeſtal as now it hath?

P. No. Nor even a *Baſe* to the *Shaft* of its *Column*, for in the faireſt Works of Antiquity, as the Theatre of *Marcellus* at *Rome*, that at *Vicenza*, and many others in which this Order has been employed, 'twas found without *Baſes*.

M. What do you ſuppoſe to be the Reaſon that the Antients did not allow a Baſe to the Dorick Order?

P. Becauſe that its Aſpect is robuſt and ſtrong, like unto that of *Hercules*, who is always repreſented on his bare Feet.

M. And therefore muſt this Order be always uſed without a Baſe?

P. No. For the modern Architects have given it that *Baſe* which *Vitruvius* calls *Attic*.

M. What is the Attic Baſe composed of?

P. PLINTH (A) two *Torus*'s (B and D) and (the) *Scotia* (C, with its Fillets) Fig. II.

M. What do you mean by the Word Scotia?

P. SCOTIA (Greek) *Skotos*, Darkneſs, called by ſome *Trochilus* from the Greek *Trochilos*, a Pully; 'tis a hollow Moulding between the *Tores* of a *Baſe*, as C. Fig. II.

M. What is the Height of the Dorick Column including its Baſe and Capital?

P. Eight Diameters when ſet alone, and ſeven when ſet in *Porticoes*, &c.

M. What is the Height of the Attick Baſe?

P. Half the Diameter or thirty Minutes preciſely.

M. Is the Capital of the ſame Height alſo?

P. Yes.

M. What are the Parts of the Dorick Capital?

P. Its *Abacus* L, *Ovolo* I, *Annulets* H, and *Hypotrachelium* G.

M. Is not the Aſtragal F *and its Liſt a Part of the Capital?*

P. No. They are a Part of the *Shaft* or *Column* E.

M. How many Parts is the Dorick Column compoſed of?

P. Four, viz. The *Aſtragal* and its *Fillet* or *Liſt*, the *Shaft* and the *Cincture* Z.

M. Hath the Dorick Column any Ornament more than its Baſe, Shaft and Capital?

P. Yes, its *Fluteings*, called by the French *Cannelures*, and by others *Striures*, from *Striges*, Folds of a Garment, which *Vitruvius* ſays, they were at firſt deſign'd to repreſent.

M. What number of Flutes is in a Dorick Column?

P. Twenty.

M. Are there as many in a Dorick Pillaſter?

P. No. A *Dorick Pillaſter* (as well as the *Ionick*, *Corinthian* and *Compoſita*) ought to have no more than ſeven Flutes.

M. What do you call thoſe Spaces between the Flutings?

P. *Striæ*, *Liſts* or *Fillets*.

M. What Proportion doth thoſe Fillets bear to the Flutes?

P. One third or fourth Part of the Breadth of a *Flute*.

M. Are Columns ever fluted without Fillets?

P. Yes. Frequently in the Dorick Order but no other.

M. What depth are the Flutes to be cut?

P. About one third of their Breadth.

M. I have obſerved in Columns that their Flutings have been filled up with a Swelling a third Part of the Column's height from the Baſe, pray tell me what you call them?

P. Such *Columns*, whoſe *Flutes* are ſo filled, are call'd ſtav'd or cabled *Columns*.

M. Now let's return to the Entablature of this Order, and firſt explain the Architrave.

P. The *Architrave* of this Order ought to be ſolid and ſubſtantial, and never to have more than two *Facia*'s, as M, N. Fig. II. with its *Tenia* or *Band* P which crowns it.

M. Is there never any other Ornament to the Dorick Architrave?

P. Yes. When the *Freeze* is enriched with its *Triglyphs*.

M. What are thoſe Ornaments?

P. GUTTÆ's or *Drops*, placed under the *Tenia*, in ſuch Manner, as if they had flowed from the Channels of the *Triglyph* through the *Tenia*, and ſmall *Fillet* or *Moulding* under it.

M. How many of thoſe Guttæ or Drops are placed under each Triglyph?

P. Six, which are made flat as a *Triangle*, or round, like a *Cone* cut from the *Vertex*, perpendicularly to its *Baſe*.

M. Are theſe Guttæ's or Drops ever uſed in any other Part of this Order?

P. Yes, in the *Plancere* of the *Corona*, and *Modilions*, and are 36 in number.

M. What are the Ornaments of the Freeze?

P. Its *Triangles* and *Metops*.

M. Pray explain them.

P. 1. A TRIGLYPH, in Greek ſignifies a three ſculptured Piece, *quaſi tres habens Glyphas*, was firſt uſed in the *Delphic* Temple, repreſenting an *Antick Lyre*, which

Inſtrument *Apollo* had been the Inventor; the *Italians* call them *Planetti*, ſmall plains. Their Breadth is always equal to half the Diameter of the *column*, or 30 Minutes, and Height to the Height of the Freeze, being crown'd with part of the upper *Tenia* R. The two angular Hollows, being but half channell'd, are therefore called *Semicalicula*.

2. METOPS, from the Greek, *Metope*, *Meta* and *Ope* between three, is the ſquare ſpace in the *Freeze*, between the *Triglyphs*, which was anciently adorn'd with Ox's Skulls, Inſtruments us'd in Sacrificing, &c. But now, moſt properly with Fruit, Flowers, &c. when introduced in Gardens or with the Arms of the Gentlemen to whom the Building belongs.

M. What is the chief thing to be obſerved in Metops?

P. That they be truly ſquare.

M. What are the Parts of the Dorick Cornice?

P. The *Cavetto* S, the *Ovolo* T, the *Planton* V, the *Corona* W, the *Cima*

Recta X, and *Inverta* Y, whoſe Total is ſix.

M. Pray explain the ſix Parts of the Cornice?

P. I will. Firſt, the *Cima Recta* Y is the ſame as W in Fig. I.

Secondly, The *Cima Inverta*, or *Inverſa* X, is of the ſame reſemblance of the rouling Wave, as in *Cima Recta*, a Wave ready to fall with its hollow Part reſting upon the *Corona* at one extream, and as if 'twere juſt falling from *Cima Recta* with the other. The *Corona* W is already explained in Lect. I. and II. as alſo is *Cima Reverſa* X, and *Cima Recta* Y.

M. Is not the Character of this Cornice threefold?

P. Yes. There is one very plain, as that of *Palladio*, *Serlio*, *Bullant*, *Cataneo*, *Barbaro* and *De Lorme*, who uſes neither *Mutules* nor *Dentels*.

Secondly, There is another more compounded, having *Dentils*, as at the Theatre of *Marcellus* at *Rome*, that of *Scamozzi* and *Vignola*. And

Laſtly, When *Mutules* is uſed without *Dentils*. The Ornaments of this *Cornice* being thirty ſix *Drops* (or *Bells*) cut under each *Mutule*, ſhould be ſhaped like ſmall *Cones*, whoſe Points or Tops are ſunk into the under Bed of the *Mutule* or *Corona*.

M. I find by the preceding, that Mutules and Dentils are often uſed, pray explain to me what Mutules and Dentiles are?

P. I will. MUTULI (from the Latin) is a little inverted *Conſole* under tbe *Soffit*, by us called *Modillion*, which always ought to correſpond with the Middle of the *Columns*.

Theſe *Modilions* are particularly affected to the *Corinthian* Order, where they are always adorn'd with carved Works, &c. In the *Dorick*, *Ionick* and *Compoſite* they are more plain, having ſeldom any Enrichment, excepting a ſingle Leaf underneath.

Secondly, DENTICLES (a Member of the Cornice) immediately above the *Cymatium* of the *Freeze*, cut after the Manner of Teeth. Theſe are now particularly affected in the *Dorick* Order, notwithſtanding that anciently they were not admitted therein. The ſquare Member, whereon they are cut, is called the *Denticule*, and in Latin *Denticulus*.

Ionick Order.

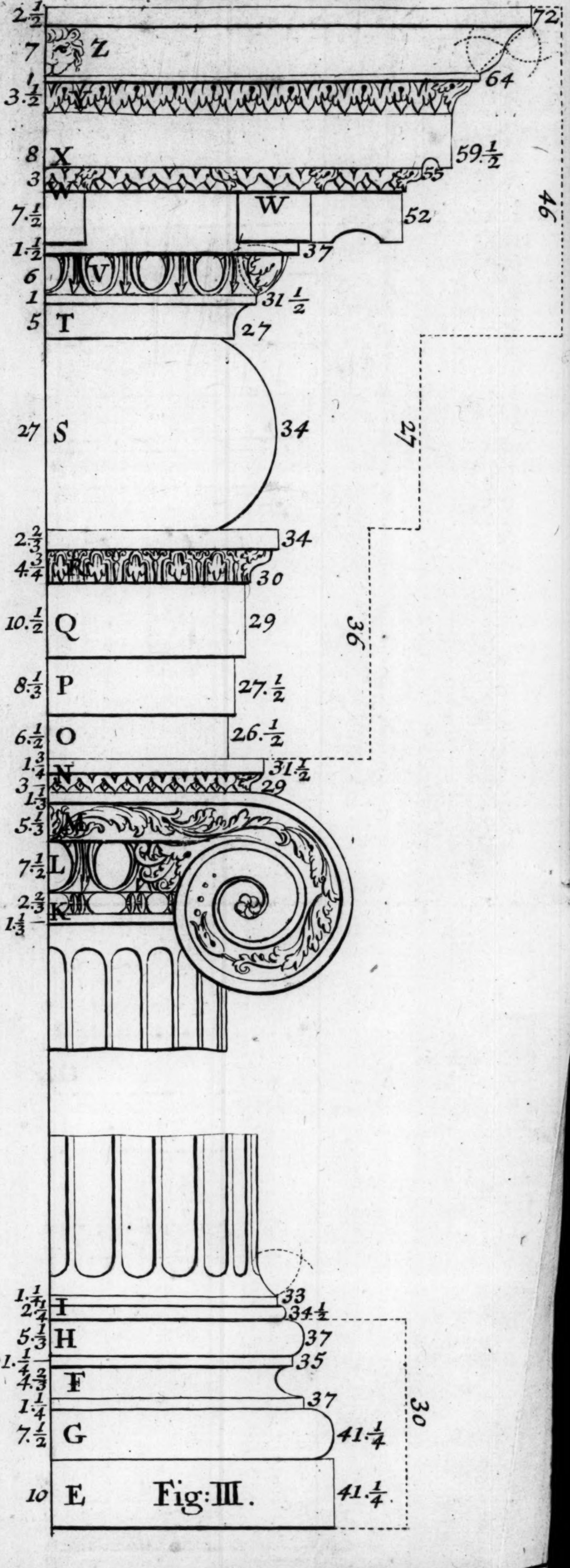


Fig: III.

LECTURE IV.

Of the IONICK *Order.*

M. *WHY is the Ionick Order ſo called?*

P. Becauſe it was firſt invented by ION, in *Ionia*, a Province in *Aſia*, who is ſaid to have erected a Temple of this Order to the Goddeſs DIANA.

M. What doth the Ionick Order repreſent?

P. A Kind of feminine Slenderneſs, not like a light Houſewiſe, ſaith *Vitruvius*, but in a decent Dreſs hath much of the Matron.

M. I obſerve that the Ionick Baſe differs from the Dorick Baſe in the upper Part thereof, I deſire that you explain the Parts of that Baſe.

P. I will. Firſt the *Plinth* E, the lower *Torus* G, the *Scotia* F, and upper *Torus* H is already explained in the *Dorick* Order, and the *Aſtragal* I, compleats the whole *Baſe*, as required.

M. I underſtand your Demonſtrations very plainly, pray go through the whole Order in the ſame Manner.

P. I will, and begin with the *Capital*, and ſo proceed to the upper Part of the *Cornice*.

Firſt, The *Capital* which is compoſed of three Parts, *viz.* the *Abacus* N, the *Voluta* M, and the *Ovolo* L.

Secondly, The *Architrave*, compoſed of four Parts, *viz.* the *Cima Reverſe* R, the Firſt *Faſcia* Q, the Second *Faſcia* P, and the Third *Faſcia* O.

Thirdly, The *Freeze* S.

Fourthly, The *Cornice* compoſed of ſix Parts, viz. The *Cavetto* T, the *Ovolo* V, the *Modillions* W, the *Corona* X, the *Cima Reverſa* Y, and the *Cima Recta* Z.

M. Is this Column ever fluted?

P. Always, 'tis from this Order that the *Flutings* firſt were taken, and was originally made to repreſent the Folds of Garments.

M. How are theſe Flutings deſcribed on the Baſis of a Column?

P. Divide the Circumference of the *Baſe* into twenty four equal Parts, and each of thoſe Parts into four Smaller. Give to each *Flute* three of thoſe ſmall Parts, and to each *Fillet* one, the depth of each *Flute* muſt not exceed above one third of its Breadth.

M. How do you find the Centers of the Flutes?

P. Two Ways; as firſt, complete the *Equilateral Triangle* o, n, m, ſo ſhall n be the Center required, or,

Secondly, Complete the *Geometrical Square*, and draw its Diagonals, and the Center of the Geometrical Square ſhall be the Centre of the *Flutes* required.

M. I underſtand you very well, I now deſire that you demonſtrate to me the Manner of deſcribing the Ionick Voluta.

P. I will, Firſt, draw the *Aſtragal* A B, and through the Middle thereof the Line c, d; then from the Top of the *Abacus* let fall perpendicular to the former, another Line paſſing through the Center of the Circle or Eye of the *Volute*, as h i. Within this Circle are the twelve Centres to be placed on which the *Contour* of the *Voluta* is deſcribed and are thus to be found. Deſcribe a Geometrical Square whoſe Diagonals are one in the Horizontal Line and the other in the perpendicular Line, croſſing each other in the Center of the Eye; from the Middle of the Sides of this Square draw two Lines which divide the *Square* into four, and each Line being divided equally into ſix Parts, gives the twelve Centers, or Points required, as they are numbred in the Eye of the *Volute*. To deſcribe the *Volute*, open your Compaſſes from No. 1. (in the Eye of the *Volute*) to that Place where the perpendicular Line cuts that of the lower Part of the *Abacus*, and draw a quarter of a Circle, viz. continue it till it meets the Horizontal Line c, d.

Secondly, On the Point 2 place, your Compaſſes, and open them to the Arch laſt deſcribed, and continue the Arch Line till it meets the perpendicular h, i.

Thirdly, On the Point 3, place your Compaſſes, and open them to the Arch laſt deſcribed, and continue the Arch Line till it meets the Horizontal Line c, d.

Fourthly, On the Point 4, place your Compaſſes, and open them to the Arch laſt deſcribed, and continue the Arch Line till it meets the perpendicular h i, and in like manner, you may turn it about till you have turned off all the *Twelve Centers*, which will deſcribe the *Contour* of the *Volute* as required.

M. I obſerve that Twelve Centers deſcribe the Outſide Line; pray how is the Inſide Line deſcribed, ſo as to have a proportional Diminution?

P. This *Inſide Line* or *Border* is deſcribed by a ſecond Draught, in the ſame manner as the firſt was, placing the fix'd Foot of the Compaſſes in *Twelve other Centers*, very near the firſt, *viz.* At the *fifth part* of the Diſtance that is between the former, under which they ought to be reckon'd towards the *Center* of the *Eye*. Note, that theſe 12 Centers are repreſented in the *Eye* of the *Volute* by 12 Points, made larger than any other, on which the Inſide Line may be deſcribed as required.

◆

LECTURE V.

Of the CORINTHIAN *Order.*

WHY is the Corinthian Order ſo called?

P. Becauſe it was firſt deſigned by an *Architect* of *Athens*, and executed at *Corinth*, from whence it had its *Original* and *Name* of *Corinthian Order*.

M. Is this Order ever fluted?

P. Yes, very often.

M. How many Flutes are generally allowed to this Order?

P. Twenty Four, as in the *Ionick*, and ſometimes according to the *Compaſs* and *Station* of the *Column*; the Flutes may be augmented to *Thirty*.

M. What are the Parts of the Corinthian Baſe?

P. The *Plinth* A, the *lower Torus* B, the *Aſtragal* C, the *Scotia* D, the *upper Torus* E, and the *Aſtragal* F.

M. Pray

Corinthian Order.

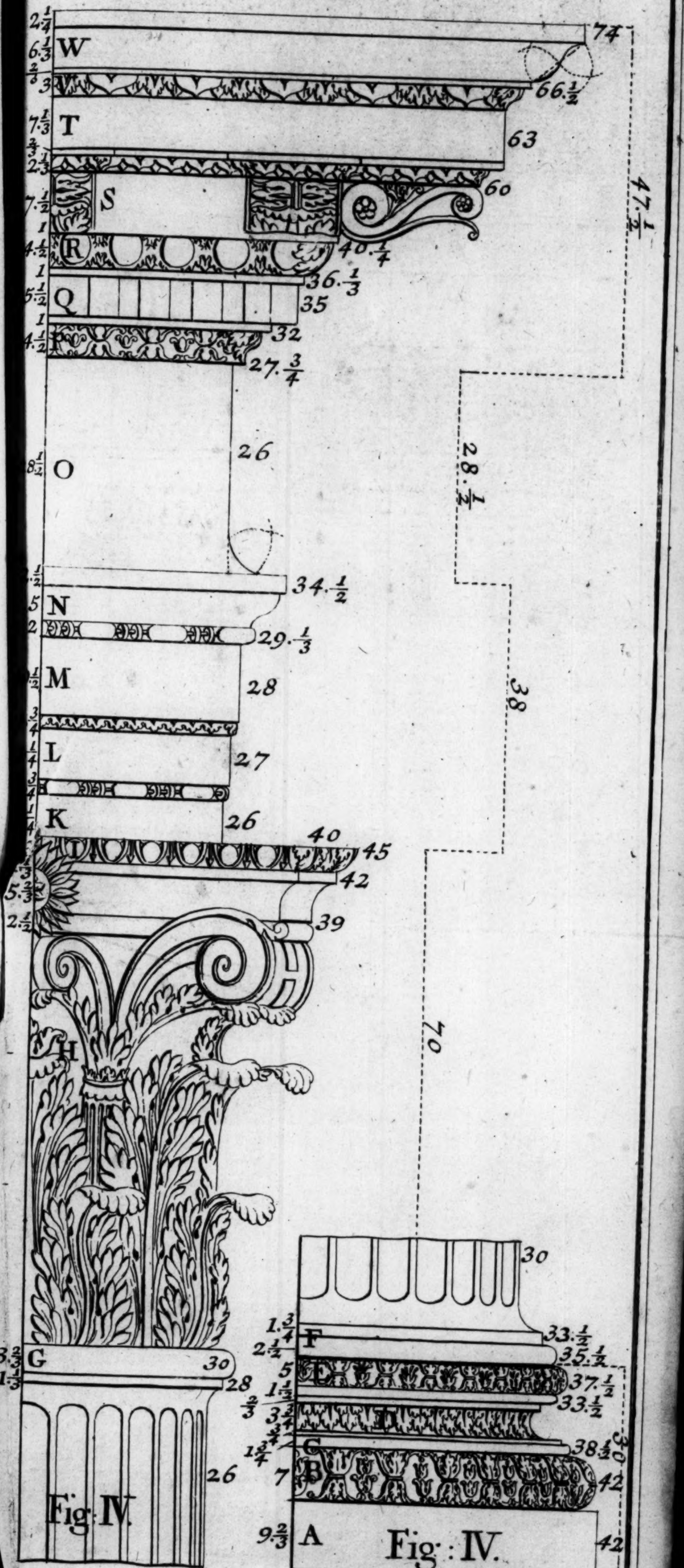


Fig: IV.

Fig: IV.

M. Pray go through the remaining part of the Order.

P. I will.

Firſt, The *Capital* H, whoſe Leaves are the *Acanthus* or *Branca Urſina*, Bears Foot, *firſt invented by Callimachus*, an *ingenious Statuary* of *Athens* upon ſeeing this Plant ſpreading its ſelf around a *Basket*, that had been placed upon the *Tomb* of a young *Corinthian* Lady, and covered up with a Tile. The *Leaves* he imitated in his *Scrolles* or *Volutes*, the *Basket* in the *Vaſe* or *Tambour*, and the *Tyle* or Covering in the *Abacus* I.

Secondly, The *Architrave* compos'd of four Parts; *viz. Cima reverſa* N, and the *three facias* M, L, K.

Thirdly, The *Freeze* O, generally adorn'd with all Kinds of Figures and various Compartments at Pleaſure.

Laſtly, The *Cornice* wherein are both *Dentelli* and *Modiglioni*, called by our Workmen *Teeth* and *Cartouzes*, conſiſting of ſeven Parts, *viz.* The *Cima* or *Cavetto* P, the *Dentils* Q, the *Ovolo* R, the *Cimaſium* and *Modillions* S, the *Corona* T, the *Cima Reverſa* V, and the *Cima Recta* W.

LECTURE VI.

Of the COMPOSITE *Order.*

WHY is the Compoſite Order ſo called?

P. Becauſe 'tis *compoſed* of the *Ionick* and *Corinthian Orders*, and not a compleat *Order* of its ſelf. 'Tis of *Roman Extraction*, and by many is called the *Roman Order*, and by ſome the *Italian Order*.

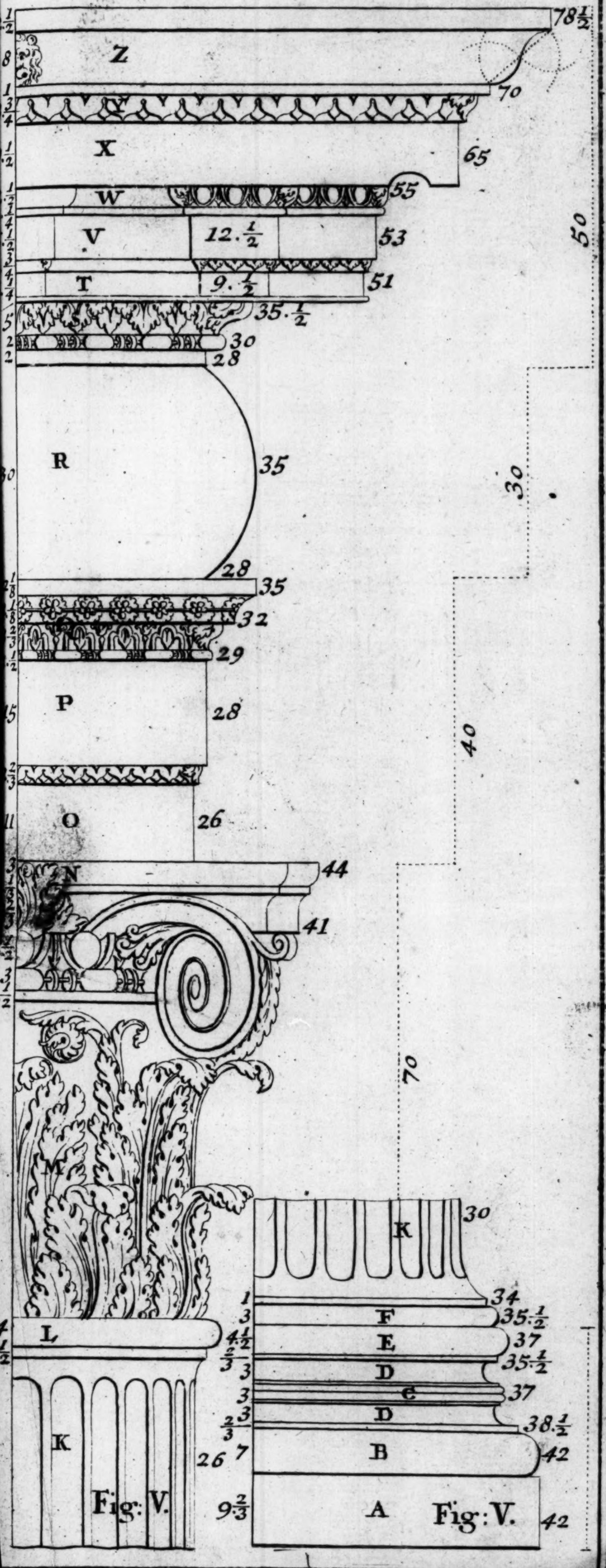
M. What are the parts of the Compoſite Baſe?

P. Six, The *Plinth* A, the *lower Torus* B, the *Aſtragal* C, the *Scotia* D, the *Upper Torus* E, and the *Aſtragal* F.

M. Pray go through the whole Order in like manner?

P. I will.

Composite Order



Firſt, The *Capital* M, compos'd of two Rows of *Leaves*, proper to the *Corinthian* and the *Volutes* of the *Ionic*.

Secondly, The *Architrave* compos'd of three parts, *viz.* The *Cimaſium* Q, and the two *Facias's* P, O.

Thirdly, The *Freeze* R.

Laſtly, The *Cornice* which is compos'd of ſeven parts, *viz.* The *Cima* or *Cavetto* S, the lower part of the *Modillion* T, the upper part of the *Modillions* V, the *Cimaſium* W, the *Corona* X, the *Cima Reverſa* Y, and the *Cima Recta* Z.

M. You having thus demonſtrated all the ſeveral parts belonging the Five Orders in Architecture, pray now ſhew me how to draw or delineate an entire Order in Architecture.

P. I will; but before we can come to the *Practice*, I muſt teach you a few *Geometrical Problems*.

* * *

PROBLEM I.

FIG. XVI.

To erect a perpendicular, from a Point given in the middle of a Line.

LET h i be a Right Line given, and 'tis required to raiſe the *perpendicular* e d, from the given Point e. *Practice*, open your Compaſſes to any diſtance, as e f, and make e g equal to *e f.*

With any opening of your Compaſſes greater than f e, on f, deſcribe the Arch b b, and on g the Arch a a, interſecting the former in d, draw d e, and 'tis the *perpendicular* required.

* * *

PROBLEM II.

FIG. XVII.

To draw a right Line parallel to a right Line given. Let it be required to draw the right Line i k, *parallel to the right Line* g h, *at the Diſtance of the right Line* a b.

PRactice, Take the right Line a b, in your Compaſſes, and on any part of the right Line g h, as at c, deſcribe the Arch f f, and on any other Point towards the end of the Line g h, as at d, with the ſame opening deſcribe the Arch e e. If you lay a Ruler on thoſe two Arches, ſo as but juſt to ſee the Convexity of them, and draw a right Line, that Line ſo drawn ſhall be *parallel* to the right Line g h, as required.

PROBLEM III.

FIG. XVIII.

To make an Equilateral Triangle, whoſe Sides ſhall be equal to a right Line given. Let it be required to make the Equilateral Triangle a e d, *equal ſided to the given right Line* f g.

P*Ractice*, Make d e, equal to f g, then with your Compaſſes on e, with the opening e d, deſcribe the Arch c c; and with the ſame opening on d, the Arch b b croſſing the former in a, join a d, and a e, and it will complete the *Equilateral Triangle*, whoſe Sides ſhall be each equal to the given Line f g.

PROB.

PROBLEM IV.

FIG. XIX.

To divide a right line into any Number of equal Parts. Let it be required to divide the right Line a b, *into ten equal Parts.*

PRactice, draw a right Line at pleaſure as *d e*, open your Compaſſes to any ſmall opening, and run them along the Line *d e* ten Times, complete the *Equilateral Triangle c d e*, and from the Point *c*, through the ten Diviſions draw right Lines: *Laſtly*, Take the given Line in your Compaſſes, and place it from *c* to *b*, and from *c* to *f*, and draw *f b*, ſo ſhall the Line *f b*, which is equal to *a b*, be divided into ten equal Parts as required.

M. Theſe four Problems I underſtand; is there any other thing neceſſary for me to know, before I begin drawing.

P. Yes, I muſt firſt remind you what is meant by *Modules and Minutes*, altho' I have ſaid ſome thing thereof already; alſo what is meant by *height and projecture* of any Member, *&c.*

Firſt, A *Module* is the *Diameter* of a *Column* at its *Baſe*, divided into *ſixty equal Parts*, called *Minutes*.

Secondly, The Height of a Moulding, is the thickneſs as is contained, between one and the other moulding.

Thirdly, *Projecture*, ſignifies the *Prominency* or *Emboſſment*, which the Mouldings have, *beyond the Naked of the Wall*, which is always in Proportion to its *Height*, and herein *you* muſt *note* that *I ſet off all my Projectures from the Centeral Line of the Column*, and not from the upright or face of the *Column* as many do.

M. Which of the Five Orders, ſhall we begin with.

P. The *Dorick*.

M. What is the firſt Work to be done?

P. To make your *Module to work by*, which is taught by the *fourth Problem hereof*, to divide a right Line into any number of equal Parts.

M. Of what Dimenſion ought this Module to be?

P. Let it be equal to the Line XX, Plate 2d, divided into ſixty equal Parts, or *Minutes.*

M. I obſerve in the Five Orders, that at the end or Projection of every Member there be Figures placed, as alſo between the Mouldings at the back ſide; pray what doth thoſe Figures ſignify?

P. Thoſe Figures placed at the *Extreams of the Mouldings* repreſent the *number of Minutes* as thoſe *Mouldings* project from the *Centeral Line* of the *Column*, and the other Figures between the *Mouldings* at the *backſide* repreſent the *number of Minutes* as every *Member* is in height. But to make the thing more plain, I will draw *an entire Order*, and for that Purpoſe I make choice of the *Attick Baſe* with the *Dorick Order.*

FIGURE VII.

PLATE II.

1. MAke A B equal to *forty Minutes*, and on A, by the firſt Problem hereof erect the *perpendicular* A N, which muſt repreſent the *Centeral Line* of the *Column*.

2. Take *ten Minutes* the height of the *Plinth*, and ſet it from A to B, and draw B 40, parallel to A B, make A B and B 40, each equal to 40 Minutes, and join 40 B, ſo ſhall the *Plinth* be compleated.

3. From B to C ſet off *ſeven Minutes* and *half* for the height of the *lower Torus*, and draw C K parallel to B 40, make C K equal to 36 Minutes $\frac{1}{3}$ as alſo B M, draw K M, and biſſect it in N, on which Point N, deſcribe the Semicircle M P K, ſo ſhall the *lower Torus be compleated*.

4. At the parallel Diſtance of one *Minute* and $\frac{1}{4}$, draw E L, which make equal to C K join L K, ſo will the *Fillet be compleated.*

5. At the parallel Diſtance of *four Minutes* $\frac{1}{2}$ draw F n, which make equal to *thirty five Minutes,* draw n L and biſſect it in m, whereon deſcribe the Arch n Q L, ſo will the *Scotia* be compleated.

6. At the parallel Diſtance of *one Minute* and $\frac{1}{4}$ draw G o, which make equal to F n, and join o n, ſo ſhall the *Fillet* be compleated.

7. At the parallel Diſtance of *five Minutes* and *half,* draw H q which make equal to *thirty three Minutes* $\frac{1}{2}$, draw q o, and biſſect it in P and on P, deſcribe the *Curve* o R q, ſo ſhall the upper *Torus* be compleated.

8. Set up *one Minute* and *quarter* from H to I for the height of the *Cincture,* and draw I r, parallel, and equal to H q, join H q, and the *Cincture* is compleated.

9. Make H S equal to *thirty Minutes,* or r S equal to *nine Minutes* $\frac{1}{2}$ in Fig. VIII. and draw S t the upright of the *Column*

perpendicular to S L, make S t equal to double S q, and draw the Line t r, on r, with the Diſtance r t deſcribe the Arch t u, and on t, the Arch r u. *Laſtly*, on u with the Interval u r, deſcribe the Arch r t, and that will complete the *Attick Baſe*, as required, as alſo the *Cincture* or *Baſe* of the *Shaft*.

P. I having laid down the manner of deſcribing the *Attick Baſe*, I ſhall now proceed to lay down the *Dorick Capital* and *Entablature*, to which I proceed.

1. Draw A a, equal to *twenty eight Minutes*.

2. At the parallel Diſtance of one *Minute* and *half*, draw B b, which make equal to A a, and join a b, alſo at the parallel Diſtance of *three Minutes* and *half* draw C e, equal to *twenty eight Minutes*, and deſcribe the Semicircle b, 30 e, ſo ſhall the *Aſtragal* be compleated.

3. Set up *nine Minutes* from C to D, and draw D f, parallel to G D, make C D, and D f, each equal to *twenty ſix Minutes*, and draw f d; ſo ſhall the *Freeze* of the *Capital* be compleated.

4. Set off *three Minutes* ⅓ from D to E and draw E k, parallel to D f, and make E k, equal to *thirty Minutes.* Divide D E, into *three equal parts*, and draw the *Annulets* g h i.

5. From E, ſet off *ſix Minutes* and *half* to F, and draw F n parallel to E L, making F n equal to *thirty ſix Minutes*, join n k, which divide into *five equal parts*, and on k and n, with four of thoſe parts, deſcribe the Arches, croſſing each other in m, on which Point with the Interval m n, deſcribe the Arch n k, ſo ſhall the *Ovolo* be compleated. Vide Fig. X.

6. Set off *ſix minutes*, from F to G, and ¾, and draw G o, parallel to F n, which make equal to 36 Minutes, make G o, equal to F n, and draw o n, ſo ſhall the *Abacus* be compleated.

7. Set off *two minutes* and *two thirds* from G to H, and draw H S, parallel to G o, and equal to *thirty nine minutes*, as alſo draw I t, at the parallel Diſtance of *one minute* and ¾, join t, S, and S o, (as ſhall be taught by and by) and the *Cimaſium* will be compleated, which doth compleat

the whole *Capital* as required. The next is the *Architrave*, *Freeze* and *Cornice*.

1. Make a A equal to *twenty ſix minutes*.

2. Set up *eleven minutes*, from a to B, and draw B c parallel to a A, and make B b equal to a A, and join b A, ſo will the *firſt Faſcia* of the *Architrave* be compleated.

3. Continue B b, to c, making it equal to *twenty ſeven minutes*.

4. Set off *fourteen minutes* and *half*, from B to C, and draw C d parallel to B c, make C d, equal to *twenty ſeven minutes*, and draw d c, ſo ſhall the *ſecond Faſcia* be compleated.

5. Continue C d, to e, making C e equal to *thirty minutes*, ſet off *four minutes* and *quarter* from C to D, and draw D f parallel to C e, and equal to *thirty minutes*, join f e, and the *Tenia* will be compleated, which doth compleat the *Architrave* as required.

6. Set up *forty five minutes* from D to E, and draw E h, parallel to f D, make E h and D g, each equal to *twenty ſix minutes*, and

draw h g, ſo ſhall the *Freeze* be completed.

7. Set up five minutes, from E to F, and draw F L equal to thirty Minutes and half, and parallel to E h, make E i, and F k, each equal to twenty ſeven Minutes, and join k i, ſo ſhall the *Capital* of the *Trigliph* be completed.

8. Set up five Minutes, from F to G, and draw G n, parallel to F l, make G n, equal to thirty five Minutes and $\frac{1}{2}$, alſo draw H o, equal to G n, at the parallel Diſtance of $\frac{3}{4}$ of a Minute and join o n.

9. Make l z, equal to G F, ſo ſhall z be the *Center* whereon you muſt deſcribe the *Cavetto* n, z, l.

10. From H, ſet up ſix Minutes to I, and draw I r, parallel to H o, and equal to ſixty four Minutes and half, make I 2, equal to thirty nine Minutes and half, and draw g o, on o with the Interval o g, deſcribe the Arch g P, and with the ſame Diſtance on q, the Arch o P, croſſing in P, on which *Center* deſcribe the *Ovolo* o 2.

11. Set up eight Minutes from I to K, and draw K S parallel to I r, and make K S equal to I r, join S r, and 'twill compleat the *Corona*.

12. Set up three Minutes and quarter from K to L, and draw L y parallel to K S, alſo at the Diſtance of three quarters of a Minute, draw M P, parallel to L y, and make each of them equal to ſixty eight Minutes, draw y t, Fig. XII. which divide in w, and with the opening w t, deſcribe Arches croſſing in u and x, which are the *Centers*, to deſcribe the *Cima Reverſa*.

13. Set up ſix Minutes¼ from M to O, and draw O S, parallel to M P, alſo draw N T, at the parallel Diſtance of two Minutes and one quarter, and make N T and O S, each equal to ſeventy ſix Minutes, and join T S.

Laſtly, Draw S P, which divide in V, and with the Diſtance V P, on P deſcribe the Arch V Q, and on V the Arches P Q and R S, and on S the Arch V R, ſo ſhall R and Q be the *Centers*, on which you may deſcribe *Cima Recta*, which doth compleat the whole *Entablature* as required.

M. Pray now, how do you deſcribe the Triglyphes of the Dorick Order.

P. I will ſhew you immediately; this *Ornament* is very rarely uſed in any Order beſides the *Dorick* and its Situation is always in the *Freeze*, placed exactly over the middle of the *Column*, its height is always the ſame of the *Freeze*, and its breadth is always equal to thirty Minutes every *Triglyph*; is divided into ſeven Parts, *viz.* two entire *Glyphes* or *Channels*, (as z m), two *Semi Glyphes* as z i, and three *Spaces* or *Interſtices*, as z l, *&c.*

To draw theſe *Triglyphes*, you muſt make D Z and E b, each equal to fifteen Minutes and draw b Z.

2. Divide E b, or D Z into ſix equal parts, and draw the Lines a b, a b, parallel to Z b, make b x, and a o, equal to two Minutes and draw x o, alſo make, a o, a m, and a o, equal to two Minutes, and draw o m o.

3. On x deſcribe the Arch o n, and draw the Chord Line o n, alſo with the ſame opening on m, deſcribe the Semicircle o, n, o, and draw the Chord Lines o n, on.

4. Draw the Lines b Z, a b, *&c.* through the *Tenia* towards o o o, *&c.* and draw q q, at the parallel Diſtance of five Minutes and half, from C d, alſo draw p p,

at the paralell Diſtance of one Minute and half.

Laſtly, Draw right Lines from r r, *&c.* The Points of Interſection towards, c c, *&c.* the middle of the *Tenia*, till they meet the Line p p, and they will form the *Guttæ* or *Drops*, and compleat the *Triglyph* as required.

'Tis here to be obſerved alſo, that every *Triglyph* muſt be divided into twelve equal Parts, of which every entire *Channel*, as well as the *Spaces* between, lays claim to two Twelfths each, and the *Semi-Channel* at the *Extreams*, but to one Twelfth. When an *Entablature* is adorned with its *Triglyphs*, the ſquare Spaces between is called *Metops*, as is ſaid before, which muſt always be exactly ſquare. And from hence it happens, that in many Buildings the *Triglyphs* cannot be introduced.

M. Before we depart from this Diſcourſe, pray inform me how to deſcribe an Ovolo, Cima Reverſa and Cima Recta.

P, 1. An *Ovolo*, Fig. X. the *Abacus* and *Annulets* being drawn, draw n k, which divide into five equal parts, on k and n, with the Diſtance of four of thoſe Parts deſcribe the Arches 4, 4, and 2, 2, croſſing in m, the *Center* of the *Ovolo*, on which it may be deſcribed as required. *Ovolo's* are oftentimes deſcribed *Equilaterally* as the *Ovolo* H I in the *Cornice* of Fig. VII.

2. *Cima recta*, Fig. XII. draw a i, which biſſect in o; with the Diſtance o i, deſcribe the Arches a m, m o, o h, h i, croſſing in h and m, the *Centers* of the *Cima Recta* required.

3. *Cima Reverſa*, Fig. XII. Let the Projecture be z m, which divide in ſix parts, make d y, and t b, each equal to one ſixth of z m, and draw y t, which biſſect in w, and deſcribing Arches Equilaterally croſſing in u and x the *Centers* on which you may deſcribe the *Cima Reverſa* required. *Cima Reverſa*, is alſo deſcribed as in Fig. XI. Let n b, be the *Projecture*, and n c the height: draw b c, and biſſect it in e. Divide e c into ſeven equal Parts, and on e and c, with the Interval of ſix of thoſe parts deſcribe the Arches 4 g, 2 g, and on e and b, the Arches 5 f, 7 f, ſo ſhall the Interſections g and f, be the *Centers*, on which deſcribe the *Cima Recta* required.

M. I being

M. I being thus far informed of the ſeveral Parts of a Column, as alſo how to draw an entire Order. I now deſire that you demonſtrate to me the Proportion, Diminution and Intercolumnation of the Five Orders of Columns in Architecture.

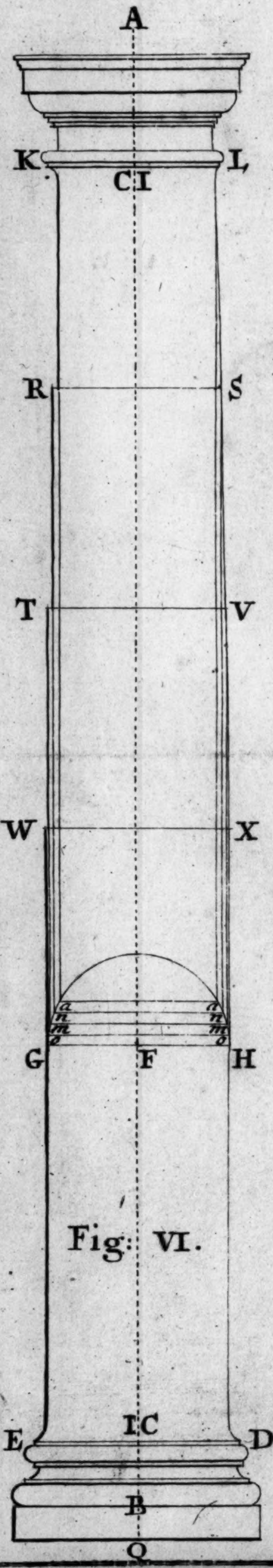


Fig: VI.

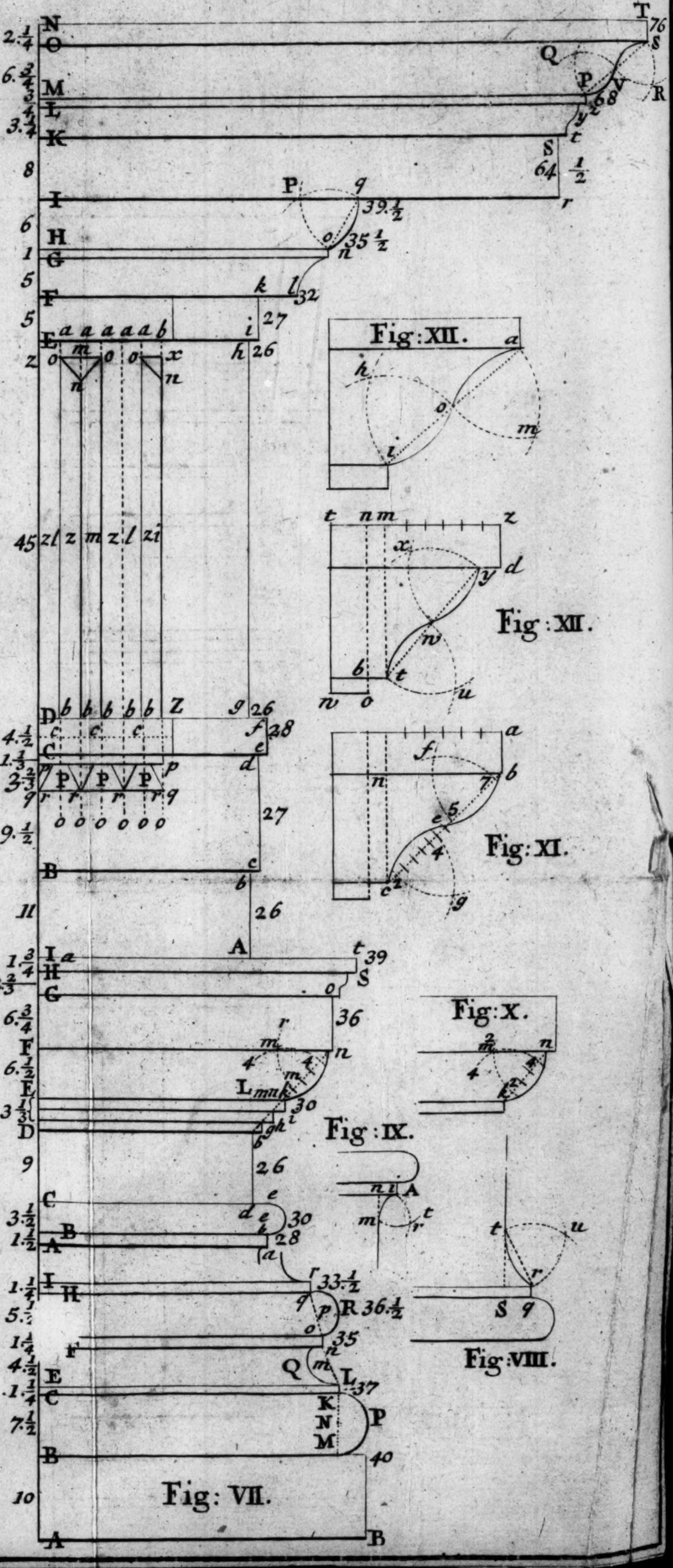


Fig: VII.

Fig: XII.

Fig: XII.

Fig: XI.

Fig: X.

Fig: IX.

Fig: VIII.

LECTURE VII.

Of the Proportion, Diminution and Intercolumnation of the Five ORDERS *of* COLUMNS *in* ARCHITECTURE.

FIrſt, The TUSCAN *Column*, including its *Baſe* and *Capital* is equal to ſeven Diameters in height, and its *Entablature* to one fourth part thereof. When it hath a *Pedeſtal* given to it, its height is equal to two Diameters.

The *Diminution* of its *Shaft* at the *Aſtragal*, is one fourth of its Diameter at the *Baſe*.

The *Intercolumnation*, may be very large where 'tis required, becauſe the *Architrave* is commonly made of *Wood*, but the moſt uſual *Intercolumnation* is four Diameters of the *Shaft's Baſe.*

Secondly, The *Dorick Column*, its height including the *Baſe* and *Capital*, is eight Diameters when alone; but when in Porticoes, *&c.* but ſeven Diameters: the height of the *Capital* is always equal to thirty Minutes, as alſo is the *Baſe.*

The *Baſe* generally uſed to this *Order* is the *Attick*, for of its ſelf, it originally had no Baſe as may be ſeen by the Profiles of the *Bath* of *Diocleſian.* The Theatre of *Marcellus*, &c. at *Rome.*

The *Entablature* is commonly two Diameters in height, and is very often adorned in the *Freeze* with *Triglyphs* and *Metops*; and as I obſerved before, that anciently this *Order* had no *Baſe*, ſo 'tis to be underſtood of a *Pedeſtal*; ſo that when a *Pedeſtal* is introduced, *Palladio* allows two Diameters and one Third for its height.

The *Diminution* of the *Shaft* at the *Aſtragal*, is equal to one fifth of the *Shaft's Baſe*, and the *Intercolumnation* is of three Diameters, excepting when the *Diſtribution* of the *Ornaments* in the *Freeze* require little more or leſs.

Thirdly, The *Ionick Column*, its height including *Baſe* and *Capital*, was anciently but eight Diameters, which the *modern Architects* thought too little, and therefore they added one Diameter more to give it *proper Stature*, ſo that its height is nine Diameters. The height of the *Entablature* is equal to one fifth of the *Column*, and its *Cornice* is always enriched with *Denticules*.

The *Diminution* of the *Shaft* at the *Aſtragal* is one ſixth part of its *Baſe*. The height of the *Pedeſtal* is two Diameters and two thirds and its *Intercolumnation*, two Diameters and one fourth, called by *Vitruvius*, *Euſtillos* as being the beſt kind of *Intercolumnation*.

Fourthly, The *Corinthian Column*, its height including *Baſe* and *Capital* is nine Diameters and half, ſometimes nine and three quarters, and oftentimes ten Diameters. The height of the *Capital* is ſeventy Minutes, of which the *Abacus* muſt be a ſixth or ſeventh part, and the remaining part being divided into three equal parts, the two lowermoſt, gives the height of the firſt and ſecond *Toure* of *Leaves*, and the third or uppermoſt part being divided into two equal parts, the lower part of the two ſhall be for the *Cauliculi*, and the upper the *Extreams* of the *Voluta's*. The *Entablatures* height is one fifth of the *Column*, and the height of the *Pedeſtal* one fourth of the *Column*. The *Diminution* of the *Shaft* at the *Aſtragal* is one ſeventh of its *Baſe*, and its *Intercolumnation* is, two Diameters and quarter as in the *Ionick*.

Fifthly, the *Compoſite Column*, its height including *Baſe* and *Capital* is ten Diameters, and the height of its *Entablature* is one fourth or one fifth thereof; its *Diminution* at the *Aſtragal* is one eight part of its *Baſe*, and the *Pedeſtal's* height is commonly equal to one third of the *Column's* height. The *Baſe* to this *Order* is, either *Attick* entirely, or a Compound of the *Ionick* and *Attick*; the *Intercolumnation* of this *Order* is one Diameter and half, and ſometimes one Diameter and three quarters.

M. Pray now, how do you do to proportionate an Order to any height, and to find the Module or Diameter of the Column to work by.

P. Firſt, your *Order* being agreed on, you muſt account how many Minutes are contained in the height of the *Column* and its *Entablature*, and then divide the height of your room, *&c.* into as many equal parts as there are Minutes in the height of your *Order*, and taking ſixty of thoſe parts that ſhall be the Diameter of your *Column*, and *Module* to work by. The *Minutes* contained in the height of the *Tuſcan Entablature*, is one hundred and four. In the *Dorick* one hundred and thirteen, in the *Ionick* one hundred and nine, in the *Corinthian* one hundred and fourteen, and in the *Compoſite* one hundred and twenty.

M. Pray how do you diminiſh Columns.

P. I will inform you.

1. Draw a line repreſenting the *Centeral Line* of the *Column*, as A Q.

2. As I have taught you before, draw the *Baſe* B.

3. Let C I be the height of the *Shaft*, equal to ſeven Diameters, and draw L I K, parallel to the *Baſe* D C E.

4. Divide the *Shaft* C I, into three equal parts, and make C F equal to one third, and draw H F G, parallel to D C E.

5. Set off the *Semidiameter* of the *Column* from C to D, from C to E, from F to H, and from F to G, and draw D H and E G.

6. Set off twenty ſix Minutes (the *Diminution* being eight Minutes) from I to K, and from I to L.

7. On F deſcribe the Semicircle H F G, and make the Line *a a*, equal to K L, and parallel to H F G, and join K a, and L a, divide the *Segments* a H and a G into any number of equal parts (the more, the more exact). But herein we ſhall make uſe but of four, at the points *n m o* G, *&c.* and draw the Chord Lines *n n*, *m m*, and *o o*.

8. Let F I be alſo divided into four equal parts, at the Lines X W, V T, and S R, which Lines muſt be drawn parallel to H G.

9. On, *n n*, erect two perpendiculars, and continue them to S and R, alſo on M m

erect two other perpendiculars and continue them to V and T, and on *o o*, erect the perpendiculars o X, and o W.

Laſtly, Lines being drawn from K to S, from S to V, from V to X, and from X to H, will form the *Diminution* of the *Shaft*, or *Column* as required.

M. I think that by this time I am throughly informed of the ſeveral parts of the five Orders of Columns in Architecture, I now deſire that you'l inform me of the ſeveral Materials relating to Building.

LECTURE VIII.

Of the ſeveral Materials relating to Building.

W*HAT are the Materials belonging to a building.*

P. Brick, Tile, Mortar, Timber, Lead, Iron, Nails, Laths, *&c*.

M. How are good Bricks to be choſen?

P. In every *Kiln* or *Clampe* there are three Degrees of Bricks. The firſt and worſt are thoſe that lie on the outſide of the *Clamp*, where the Fire has not power to burn them throughly, and theſe are called *Samell* Bricks. The next are thoſe within thoſe *Samell*, and the very beſt are they that are burnt in the Heart or Body of the *clamp*, which if they have much of *Salt-Peter* in them will run, and be as it were

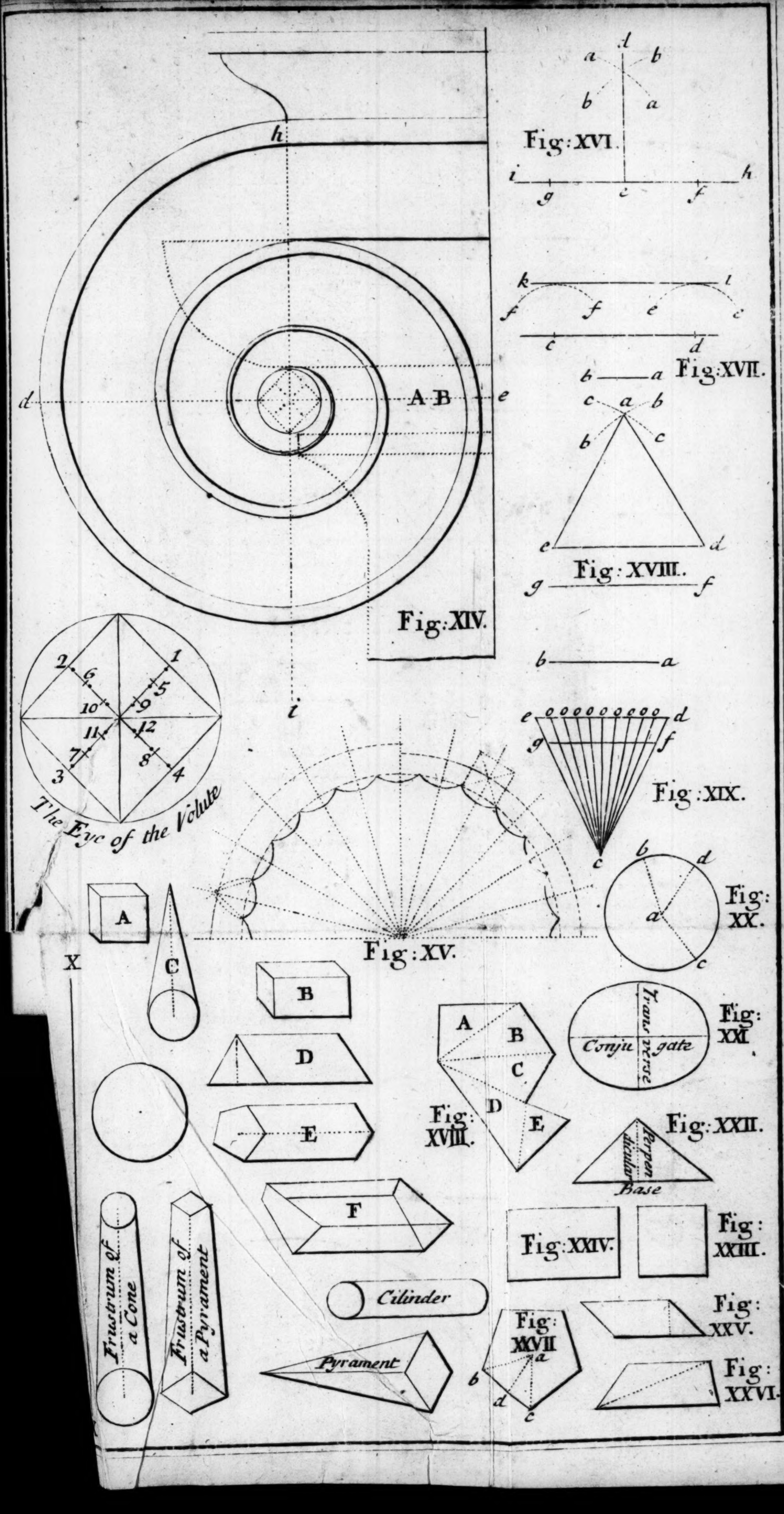
h
A B
d
e
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Fig: XIV.
2
1
6
5
10
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7
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The Eye of the Volute
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b
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Fig: XVI.
i
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Fig: XVII.
c
a
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Fig: XVIII.
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Fig: XIX.
c
Fig: XV.
b
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a
c
Fig: XX.
A
C
X
B
D
E
F
A
B
C
D
E
Fig: XVIII.
Trans verse
Conju gate
Fig: XXI.
Fig: XXII.
Perpen dicular
Base
Fig: XXIV.
Fig: XXIII.
Frustrum of a Cone
Frustrum of a Pyrament
Cilinder
Pyrament
Fig: XXVII
a
b
d
c
Fig: XXV.
Fig: XXVI.

were glazed all over; But theſe for laſting, exceed all the reſt in that *Kiln*, notwithſtanding the Earth and making be the ſame.

M. Of what magnitude ought every Brick to be.

P. Bricks have been made of divers ſizes, but the Statute takes notice but of one, *viz. That they be nine Inches in length, four Inches and half in breadth, and two Inches and half in thickneſs*; but you ſhall very rarely find them ſo, for the drying and burning, will ſhrink them in the thickneſs conſiderably, although it does, but very little in the length and breath.

M. After what manner are Bricks ſold?

P. By the Thouſand, but for their price it is uncertain in reſpect of Fuel to burn them, ſervants Wages, the conveniency of Carriage, *&c.* But the general price about *Twickenham*, *Brentford*, &c. is from 12 to 14 *s.* a Thouſand.

M. What number of Bricks may a good Bricklayer reaſonably lay in a Day; having a diligent Labourer to ſerve him.

P. In *ſound* and *new Work*, a Bricklayer will lay a Thouſand of Bricks in a Day.

M. How many Bricks will compleat a Rod of Work at one Brick and half thickneſs?

P. Four thouſand and five hundred.

M. What quantity of Lime and Sand do you allow to one Rod of Brick Work?

P. One hundred and quarter of Lime and two Load and half of Sand.

M. By the Information I have received from you, I ſhall be able to make choice of good Bricks, and the quantity of Lime and Sand neceſſary for them, I deſire you to inform me ſomething in relation to Tiles?

P. Tiles are made of a kind of Earth which is much better than that of Brick, and not much unlike that as *Potters* uſe for their Ware. The ſorts of Tiles uſed in Buildings are principally two ſorts, *viz.* Plain Tiles and Ridge Tiles. Plain Tiles ſhould be in length ten Inches and half, in breadth 6 Inches, and in thickneſs near three quarters of an Inch.

M. After what manner are Tiles ſold?

P. By the Thouſand, as Bricks are.

M. How is Tiling meaſured or rated?

P. By the Square, which is ten feet every way, making a hundred ſquare Feet.

M. What quantity of Mortar is neceſſary to lay ſquare Tiling.

P. About one fourth of part of what is allowed for a Rod of Brick work.

M. What are the kinds of Wood that Laths ought to be made off, and of what Scantlings ought they to be, and in what parts of a Building ought the ſeveral ſorts to be uſed.

P. The ſorts of Laths allowed by Statute are principally of two ſorts, the one five Feet long, and the other four Feet long. Thoſe of five Feet long, have five Score or one hundred in the Bundle, the other of four Feet have ſix Score, or 120 in the Bundle; their breadth ought to be one Inch and half, and thickneſs half an Inch, and of both theſe lengths there are three ſorts.

First, Heart of Oak.
Secondly, Sap-laths. And,
Laſtly, Deal-laths.

M. What is the reaſon that Laths are made of different lengths and goodneſs of Stuff?

P. Becauſe that all Rafters upon which they are nailed, are not placed at equal Diſtances, and the reaſon of the variety of the goodneſs of the Stuff, is always conſidered, for the place wherein 'tis to be uſed; as for Example, Thoſe of Heart of Oak, being the beſt, are moſt neceſſary for Tiling, as being moſt durable; the ſecond ſort of Sap Laths, are beſt for plaſtered Walls, and thoſe of Deal for Ceilings.

M. What quantity of Nails is uſed in laying a Bundle of Laths.

P. Five hundred to a Bundle of 5 Foot Laths, and 600 to a Bundle of four Feet Laths, every hundred of Nails containing ſix Score.

M. How many Tiles will cover a ſquare Yard?

P. Threeſcore Tiles laid at a ſeven Inch Gage will cover a Yard. But as I ſaid before, tiling is meaſured by the Square and not by the Yard.

M. How many Tiles and Laths are required to complete a Square of Tiling?

P. Six hundred and ſixty five Tiles or there abouts, will cover a Square of Tiling, with one Bundle of Laths.

M. When you firſt mentioned plain Tiles, I remember that you at the ſame time mentioned Ridge Tiles, to what uſe ſerve they?

P. To cover the Ridge or Top of the Structure, and for every 1000 of plain Tiles you have ten Ridge Tiles.

M. I am very well ſatisfied as to the Knowledge of Bricks and Tiles, and the Appurtenances incident to their uſe in Building, as Sand, Lime, Laths, Nails, &c. I now deſire that you give me the like Inſight in Timber?

P. I will.

M. How many ſolid Feet of rough Timber make a Load.

P. Fifty ſolid Feet make a Load, and for Timber ſquared fit for Building, the following are proportioned, both for depth and thickneſs, or more plainly, the ſides of the Square at the end of the Piece.

	Feet		Feet		Inch		Inch
Summers or Girders from	14	to	16	In length muſt be in their Square	11	and	8
	16		20		13		9
	20		23		14		10
	23		26		16		12
	26		28		17		14

Joyſts of	11½	In length, muſt be in their Square	8	and	3
	10½		7		3
			6		3

	Feet		Feet		Inch		Inch
Binding and Trimming Joyſt from	7	to	11½	In length, muſt be in their Square	6	and	5
					7		5
					8		5

	Inch		Inch
Wall-Plates and Beams of any Length from 15 Foot, may have in their Squares	7	and	5
	10		6
	8		6

	Feet		Feet		Inch		Inch
Purlynes from	15½	to	18½	In length, muſt have in their Square	9	and	8
	18½		21½		12		9

	Foot		Foot		Inch		Inch		
Principal Rafters cut Taper from	12½	to	14½	In length, muſt have in their Square on one ſide	8	to	5	The other ſide	6
	14½		18½		9		7		7
	18½		21½		10		8		8
	21½		24½		12		9		8
	24½		26½		19		9		9

	Feet		Inch		Inch
Single Rafters in length from 6½ to 9½	6½	Muſt have in their Square	4	and	3½
	0 -		5		4
	9½				

Principal

Principal Diſchargers of any length from	Feet 10 upward	Muſt have in their Square	Inch 13 12 and 15 13

I ſuppoſe that theſe are the principal Timbers belonging to the Building of any ordinary Edifice, in which I am well eſtabliſhed; I think that at the firſt you mentioned Lead amongſt the reſt.

P. 'Tis true I did, and 'tis a very uſeful Material, nor only for covering of Temples, Churches, *&c.* But in common Buildings for Gutters, Pipes, *&c.* to convey the water from the Houſe into ſome convenient place.

M. What thickneſs ought Lead to be of for Gutters?

P. The thinneſt is moſt generally uſed as being moſt pliable, and is commonly about eight or nine Pound to the Foot.

M. What Allowance hath the Plumber for caſting old Lead, and Workmanſhip.

P. They are generally allowed 3 Shillings per hundred Weight.

M. What are Plumbers allowed per Pound for Sother?

P. According as the Allay is with Lead, from 9 *d.* to 12 *d.* per Pound.

M. Is not Iron a very conſiderable Material in Building?

P. Yes, for making Bolts, Hinges, Dogs, Staples, Window-Bars, *&c.*

M. At what Price is ſuch Work commonly done for?

P. At 4 Pence, or 4 Pence Half Penny per Pound.

M. Are Caſements made by the Pound?

P. No, Caſements are valued according to their Magnitude, Strength and Goodneſs of Workmanſhip, from 4 Shillings to 20 Shillings a Caſement, and the like for Locks, Keys, *&c.*

M. There is one thing yet remaining, in which if you ſatisfie me, I ſhall be highly obliged, and that is, how to meaſure Superficies and Solids, and the manner of meaſuring the ſeveral parts of a Building?

LECTURE XI.

Of the Menſuration of Superficies and Solids, and the manner of meaſuring the ſeveral parts of a Building.

M. How many kind of meaſures are uſed in Building?

P. Three, *viz.* Lineal, Superficial and Solid.

M. What is Lineal Meaſure?

P. Lineal Meaſure, is the meaſuring of any thing that hath length only, as a Line, *&c.*

M. What is ſuperficial meaſure?

P. Superficial Meaſure is the meaſuring of any Subſtance that hath Length and Breadth only, as Land Pavement, Painting, Plaiſtering. *&c.*

M. What is ſolid Meaſure?

P. Solid Meaſure is the meaſuring of any quantity, that hath Length, Breadth and Depth, as Stone, Timber, *&c.*

M. What are the principal Meaſures, as are confirmed by Statute, uſed in Buildings?

P. The Foot, the Yard, and the Rod, Pole or Perch.

M. From whence have they their Original?

P. From a Barley Corn, for 'tis confirmed by the Statute of *Edw.* III. That three Barley Corns in length ſhould make an Inch, 12 Inches a Foot, 3 Foot a Yard, and 16 Feet and an half a Rod, Pole or Perch.

M. By the preceeding, I find that a Foot in length contains 12 Inches only: Pray inform me what is a ſuperficial Foot?

P. A ſuperficial Foot is a Foot in length, and in breadth, containing 144 Inches, by which is meaſured, Plank, Glaſs, Pavement, *&c.*

M. What is a ſolid or cubical Foot?

P. A ſolid or cubical Foot, is a Body like unto a Die, each ſide being equal to one Foot or twelve Inches, and the whole equal to 1728 Inches; by this Meaſure, Stone, Timber, *&c.* are meaſured.

M. What is a Yard?

P. A Yard (as is ſaid before) is a length equal to three Feet, and a ſquare Yard is equal to nine Feet, that is, three Feet multiplied by three Feet, produces nine Feet; by this Meaſure do *Paviers*, *Plaſterers*, *Joyners*, *Painters*, &c. meaſure their Work.

M. What is a Pole, Rod or Perch?

P. A Pole, Rod or Perch in length only, is a length of ſixteen Feet and half, but a ſquare Rod contains 272 Feet and a quarter, produced by multiplying 16 Feet and half, by 16 Feet and half; by this Meaſure of 272 Feet and quarter, Land and Brickwork is meaſured, as alſo digging of Ground for Buildings, *&c.*

M. Is there not any other kind of Meaſure uſed in Building?

P. Yes, but principally in the *Bricklayers* and *Carpenters* Works, which they call the Square of ten Feet, *viz.* ten Feet every way, the whole Square being equal to 100 Feet, and by this Meaſure *Carpenters* meaſure their *Carcaſs*, *Framing*, *Roofing*, *Partitioning*, *Flooring*, and the *Bricklayers* their *Tiling*, and thus much for the Explanation of Meaſures: and becauſe that the uſual way of taking Dimenſions is by Feet and Inches, I ſhall now proceed to ſhew you how to multiply Feet and Inches by Feet and Inches; before that I come to particular examples in Menſuration.

EXAMPLE I.

LET it be required to multiply 14 Foot 7 Inches by 17 Feet 11 Inches. Place the Numbers to be multiplied, in order one under another, *viz.* Feet under Feet, and Inches under Inches, making a Croſs between the Feet and Inches, and drawing a Line under them as in the Margin.

Feet Inch
14— 7
×
17—11
98
14
9—11
12—10
6—5
261 : 03 : 5

Firſt, Multiply the 17 Feet by 14 Feet, and they produce 238, which place down according to the common Practice of Multiplication, which herein happens to be in two Numbers, *viz.* 98, and 14.

Secondly, Multiply 17 Feet by the 7 Inches, and they produce 119, which divided by 12, give 9 Feet 11 Inches.

Thirdly, multiply the 14 Feet into the 11 Inches, and they produce 154, which divided by 12, gives 12 Feet 10 Inches.

Fourthly, Multiply the Inches into themſelves, and they make 77, which divided by 12, gives 6 Inches 5 Parts.

Laſtly, Add the whole together, and the Sum will be 261 Feet, 3 Inches and 5 parts.

EXAMPLE II.

LET it be required to multiply 327 Feet 5 Inches, by 30 Feet 7 Inches.

Firſt, Multiply 327, by 30, according to the common way of Multiplication, and they produce 9810 Feet.

Secondly, Multiply the 30 Feet into the 5 Inches, and they produce 150, which divided by 12, gives 12 Feet and 6 Inches.

Feet Inch
327—05
+
30—07

9810
12—6
190—9
2—11

10013 : 5 : 11

Thirdly, Multiply 327 Feet by 7 Inches, and it produces 2289, which divided by 12, gives 190 Feet and nine Inches.

Fourthly, Multiply the Inches into themſelves, and they produce 2 Inches 11 parts.

Laſtly, Add the whole together, and the Sum will be 10013 Feet, 5 Inches and 11 parts.

M. I underſtand the nature of multiplying Feet and Inches by Feet and Inches perfectly well; I now deſire that we may proceed to the Menſuration of ſuperficial Figures, and firſt I ſhould be glad to know, by what Name each Figure is called?

P. You ſhall; *Superficial Figures* are either the *Circle, Ellipſis* or *Oval, Triangle, Square, Parallelogram, Rhombus, Rhomboydes, Trapezium, Pentagon, Hexagon, Heptagon, Octagon, Nonagon, Decagon,* &c. or Figures of many unequal Sides, of which each in its proper place.

Firſt, Then the *Circle,* a plain *Geometrical Figure* contained in one Line only, in the midſt wereof there is a Point called the Center,from whence all Lines drawn to the Circumference are equal, ſo *a b* is equal to *ad,* and *a d* to *a c,* &c. The Proportion that the Diameter of any Circle hath to the Circumference is as 7 to 22, or (more exact) as 113 to 355. To meaſure the *Area* or *Superficial Content* of any *Circle,* obſerve this GENERAL RULE.

Square the Diameter (which is to multiply it into its ſelf) and multiply that Product by 11, and the laſt Product divide by 14, the Quotient ſhall be the content of the *Circle* required. As for Example, a *Circle* is 12 Feet Diameter, what's the Content.

12 The Diameter
12
144 The Diameter Squared.
11
144
144
1584, which divide by 14, as above

14)1584(113 the Content of the Circle requir'd.
14
18
14
44
42
2 remains

Secondly, An *Ellipſis*, Fig. XXI. *Greek*, an *Oval*, or *Geometrical Figure* comprehended in one only Line, but that not *Circular*, nor having all its parts equally reſpecting the Center. But from two *Focus* Points. To meaſure the *Area* or *Superficial Content* of any *Ellipſis*: Take this GENERAL RULE, multiply the *Tranſverſe* by the *Conjugate* Diameter, and *extract the ſquare Root* of their Product. That Root ſo extracted, ſhall be equal to the Diameter of a Circle whoſe Superficial Content ſhall be equal to the *Ellipſis* given, which may be found by the preceeding Rule for a Circle.

Thirdly, Right lined *Triangles*, of what form ſoever are meaſured by either of theſe GENERAL RULES.

1. Multiply half the length of the *Baſe* by the whole length of the perpendicular, and the Product ſhall be the Content required.

2. Multiply half, the perpendicular, by all the *Baſe*, and that Product ſhall be the Content required, Fig. XXII.

Fourthly, The *Geometrical Square*, Fig. XXIII. is meaſured by multiplying, one ſide by the other, as alſo is the *Parallelogram* Fig. XXIV.

Fifthly, The *Rhombus g i k l* Fig. XXV. Let fall the perpendicular *k h* which multiply by any of the longeſt Sides as *k l*, or *g i*, and the Product ſhall be the Content required.

Sixthly, The *Trapezium m*, Fig. XXVI. Divide it into two *Triangles*, and meaſure each ſeparately, as before is taught, and then adding the Sums of both Triangles together, you will have the Content of the *Trapezium* as required.

Seventhly, The *Pentagon* Fig. XXVII. from the *Center a*, draw *a b*, *a c*, and let fall the perpendicular *a d*; meaſure the *Triangle a b c*, as before is taught, which Content multiply by 5, and the Product is the Content of the *Pentagon* required, and here you muſt note that what is here ſaid of the Menſuration of a regular *Pentagon*, the ſame is to be underſtood in the Menſuration of a *Hexagon*, *Septagon*, *Octagon*, &c. When you have any unequal-ſided Figure to meaſure, as Fig. XXVIII. you muſt divide it into Triangles, marking each with an Alphabetical Letter or a Figure, then beginning with the firſt Triangle as that marked *A*, find its Content, and place it down as in the Table, and in like manner, go through with the whole; and laſtly by adding all the ſeveral Triangles together, you will have the whole Content of the unequal-ſided Figure as was required.

A---06 : 03 : 27
B--- 02 : 01 : 19
C---07 : 01 : 20
D---06 : 02 : 10
E---05 : 02 : 29

Total 28 : 03 : 25

M. I comprehend the Menſuration of Superficies perfectly well, I now deſire that you inſtruct me in the Menſuration of Solids.

P. I will. All *Solids* do conſiſt of three Dimenſions, *viz. Length*, *Breadth* and *Depth*, or *Thickneſs*.

M. What are the Solids I muſt learn to meaſure?

P. The *Cube*, *Parallelipipedon*, *Pyramis*, *Cone*, *Fruſtrum* of *Pyramids* and *Cones*, *Cylinders*, *Globes*, &c.

M. How do you meaſure the Cube A. Fig. XXIX?

P. A *Cube* is a *ſolid Body*, conſiſting of ſix ſquare Faces, or Plains, whoſe Sides are all equal, and Angles all right Angles. Let a *Cube* be 7 Feet 7 Inches ſquare, what's the Content. *The general Rule* for meaſuring of a *Cube*, is to find the Superficial Content of one Plain, and multiply that into the Depth, and the Product ſhall be the Content required.

Example.

	Feet	Inches		
The Side of the Cube	7	7		
multiplied by	7	7		
	49			
	4	1		
	4	1		
		41		
The Superficial Content of one Plain which	57	6	01	
multiplied by the depth	7	7		
	399			
	3	6		
	33	3	6	7
		3	6	
The ſolid Content required	436	10	0	7

Note, That what is here ſaid of the Menſuration of a *Cube*, the ſame is to be underſtood of the long *Cube* or *Parallelpipedon* B.

M. How do you meaſure the Solidity of a Pyramis or Cone?

P. The *Solidity* of a *Pyramis*, is found the very ſame way as the *Solidity* of a *Cone*,

Cone, which is by multiplying the Area of the *Baſe* by one third of the height, and the Product is the *Solidity* of the *Cone* or *Pyramis* required. As for Example, Fig. C. Let the Superficial Content of the *Baſe* of the *Cone* be 20 Feet, and the perpendicular height 15 Feet 3 Inches; multiply 20 Feet by 5 Feet 1 Inch, and the Product ſhall be equal to 101 Feet 8 Inches, which is the *Solidity* of the *Cone* required.

M. How do you meaſure the Solidity of a Priſm, or long triangular Solid?

P. Firſt, Find the Superficial Content of one end, (which is a Triangle as is taught before in Superfices) and multiply that Content by the length, and the Product is the *Solidity* required. As for Example, Fig. D. The Content of the Triangular end is 2 Feet 9 Inches, which multiplied by 30 Feet 7 Inches the length, gives 84 Feet 1 Inch $\frac{1}{4}$, for the *Solidity* required.

M. Suppoſe there is a regular Solid, as Fig. E. *how is it to be meaſured?*

P. Let the *Solid* be a *Pentagon* at its *Baſe*, each ſide equal to 8 Feet, and the perpendicular equal to 6 Feet: and its length 20 Foot, what's the ſolid content?

Firſt, Find the Superficial Content of the *Pentagon* as before is taught in *Superfices*.

Secondly, Multiply the length by the Content of the *Pentagon*, and the Product is the *Solidity* required; as for Example, the Superficial Content of the *Pentagon* is 120 Feet, which multiplied by 20 Feet the length, gives 2400 Feet for the *Solidity* required.

M. How do you meaſure an Irregular Solid, whoſe Ends conſiſt of unequal Sides and Angles, as Fig. F*?*

Let this irregular *Solid* be given to be meaſured.

Firſt, Find the Area of the *Baſe* as before is taught, which according to the Dimenſions placed to the *Diagonal* and *Perpendiculars* will be found to be 2 Feet 4 Inches and an half, which multiplied by 47 Feet 6 Inches the length, gives 110 Feet, 10 Inches for the Solidity required.

M. How do you meaſure the Solidity of a Cylinder ?

P. By the very ſame Rules as before delivered, *viz.* find the *Area* of one End, and multiply that into its length and the Product will be the *Solid Content* required.

M. How do you meaſure the Superficial Content of a Cylinder ?

P. Multiply the length by the Circumference, and to that Product add the *Area* of both Ends, and the Sum ſhall be the Superficial Content required.

M. How do you meaſure the Superficial and Solid Content of a Globe ?

P. I will inform you.

Firſt, For the *Superficial Content*, multiply the Diameter of the Globe, by its own Circumference, and the Product ſhall be equal to the *Superficial Content* required.

Secondly, For the *Solid Content*, cube the *Diameter*, which multiplied by 11, and its Product divided by 21, the *Quotient* will be equal to the *Solidity* required.

M. Theſe Solids which you have now taught me to meaſure are all regular, which in Practice ſeldom happens, not but that they are abſolutely neceſſary to be known ; I now deſire you to inform me whether *there are not certain Solids which moſt Timber Trees repreſent?*

P. Yes, there is, which are called *Fruſtums* of *Pyramids* or *Cones*.

M. How are they meaſured?

P. As follows,

Firſt, Find the ſuperficial Content of each end of the *Fruſtum*.

Secondly, Multiply the ſuperficial Content of one end by the other, and extract the ſquare Root of their Product.

Laſtly, This ſquare Root being added to the Sum of both *Areas* and their Sum multiplied by one third of the *Fruſtum's* length, the Product ſhall be the ſolid Content required.

Note, That what is here ſaid of the Menſuration of the *Fruſtum* of a *Cone*, the ſame is to be underſtood of the *Fruſtrum* of a *Pyramid*, the *Rule* being common to both.

M. We having now gone through the Menſuration of Superficies and Solids, let us now return to the Building, and conſider of the ſeveral Meaſures that Workmen uſe in taking their Dimenſions.

P. Firſt, Of the CARPENTER, whoſe principal Work is *Partitioning*, *Roofing* and *Flooring*, all performed by the *Square.*

The principal Things to be obſerved in taking theſe Dimenſions, are as follows.

1. In naked Flooring to allow 9 or 10 Inches, for the length of Joiſt laid in the Wall.

2. In boarded Flooring, you muſt take your Dimenſions to the very extream parts, out of which, Deductions muſt be made for Stair-Caſes, Chimneys, *&c.*

3. In meaſuring Partitions, Deductions muſt be made for Windows, Doors, and Door-Caſes, if not agreed on otherwiſe.

4. When you take the Dimenſions of a Roof, meaſure the length of the Rafter, and length of the Roof, and afterwards the Hipps by themſelves, inſtead of allowing flat and half the common way.

5. Doors, Saſh-Windows, Shop-Windows, *&c.* are taken, and meaſured by the Foot ſquare.

6. Stairs and Stair-Caſes, are valued by the Step, according to the goodneſs of the Stuff and Workmanſhip.

7. *Cornices* are meaſured by the Foot ſquare, and ſometimes by running Meaſure, as alſo are *Rails* and *Balluſtrades*, *Skirting Boards*, *Breſtſomers*, *Lintelling*, &c.

Secondly, Of GLAZIERS's Work, whoſe Dimenſions are taken in Feet, Inches and Parts, or rather by Feet, and the hundred Parts of a Foot; the principal things to be obſerved therein: Are,

1. Where Windows in a Building are all of one Magnitude, you need meaſure but one, and by that account for all the others.

2. To meaſure circular and oval Windows as ſquare Windows, of the ſame breadth as their own Diameters, becauſe that in cutting out of the Quarrels of Glaſs, there is a great waſte, and more time ſpent therein than if 'twas a ſquare Window.

Thirdly, JOYNER's Work which is meaſured by the Yard ſquare. The principal things to be obſerved herein is:

1. That their Dimenſions are taken in Feet and Inches.

2. That they girt down every *Moulding*, contained between the Cieling and Floor, which they take for the height of the Room, and the Circumference of the Room they take for the length, deducting the Doors, Windows and Chimney.

3. The Seats of Windows, *Cheeks*, *Sophetas*, &c. are all to be taken by themſelves, as alſo are Doors and Window-Shutters which are allowed Work and half Work in regard to their being worked on both ſides.

4. When *Pilaſters* or *Columns* are introduced, they are paid for according to the goodneſs of their Work; but for *Architraves*, *Cornices*, *Sub-baſe*, &c. made ſingly, they are meaſured at——*per* Foot Running Meaſure; Saſh Frames and Saſhes are at ——*per* Foot ſuperficial when together,

gether, or Saſhes ſingly, but the Frames ſingle at----*per* Frame.

Fourthly, Of PAINTER's Work, meaſured as the *Joyners* in every reſpect, excepting that of Work and half which the Painter hath none, for inſtead of accounting Doors and Window Shutters Work and half, they make it double Work being painted on both ſides.

Window-Lights, Saſh-Frames, Saſh-Squares, Door-Caſes, Caſements, *&c.* are done at----*per* Piece, and oftentimes *Modillion Cornices*, &c.

Fifthly, PLAISTERER's Work, principally of two kinds: namely,

1. Work lathed and plaſtered, called Cieling: And,

2. Work rendered, which is alſo of two Kinds, *viz.* Rendering upon Brickwork, or in Partitioning between Quarters. The principal things to be regarded herein: Is,

1. To make Deductions for all Chimneys, Doors and Windows excepting where rendering is done upon Brick, then there muſt be no Deductions made for Door or

Windows, for the Work of the *Jaums* and *Heads* commonly exceed the quantity of the Doors and Windows.

2. If the Wokman find Materials, for rendering between Quarters, you muſt deduct one fifth part for Quarters, Braces, *&c.* But if Workmanſhip only is found, you muſt meaſure the whole as whole Work, for the Workman could have performed the whole much ſooner if there had been no Quarters there.

3. In meaſuring Whiting and Colouring between Quartering, there muſt be a fourth part allowed extraordinary for the returns of the Quarters.

Sixthly, MASON's Work, which is meaſured by Foot Meaſure, *viz.* either Lineal as the coping of Walls, (which is oftentimes meaſured by the ſquare Foot alſo) or ſuperficial as in Pavements, or Solid, as Blocks of Marble, Columns, *&c.* The principal Things to be obſerved herein is, that they girt all their Mouldings as *Joyners* do, and take their Dimenſions in Feet, Inches and Parts.

Seventhly, Of BRIKCLAYER's Work.

The principal Works in a Building performed by a Bricklayer are Walling and Tyling, and what is to be obſerved therein is:

1. That the Meaſure by which Brickwork is meaſured, is a ſquare Rod, or 16 Feet and half ſquared, equal to 272 Feet $\frac{1}{4}$.

2. That the manner of meaſuring any Brickwork, hath no ſort of Difference from any other ſuperficial Meaſure, provided that the Thickneſs be equal to the Standard Thickneſs, *viz.* one Brick and half.

3. If the Thickneſs of Brickwalls are leſs or more than the Standard Thickneſs, then they muſt be reduced to the Standard Thickneſs by this GENERAL RULE.

Multiply the number of ſuperficial Feet, found to be contained upon the Superficies of the Wall, by the number of half Bricks, which that Wall is in Thickneſs; one third part of that Product ſhall be the Content of Brickwork required, reduced to the Standard Thickneſs of one Brick and half. Therefore you muſt divide the Product produced by the Multiplication of half Bricks, by 3, and the Quotient will be the true Content required.

4. That you obſerve the ſeveral Thickneſſes of the Walls, and that you make every Deduction out of its proper Thickneſs.

5. When you meaſure two Walls that conſtitute an Angle, the length of one muſt be taken to the out ſide, and the other to the inſide.

7. When you meaſure Chimneys, you muſt meaſure them as a ſolid Wall, and deduct the Vacancies, and not to girt them, as many do.

Beſides this rough Brickwork (as I may call it) there is other kind of walling performed by Foot Meaſure, and ſuch is *Facio's Arches* over *Doors*, *Windows*, &c. *Architraves*, *Freezes*, *Cornices*, *Ruſticks*, *Returns*, &c. *Peers*, *Columns*, *Pillaſters*, &c. all which are valued according to the Goodneſs of the Work.

8. The principal Thing to be obſerved in Tiling is that 'tis meaſured by the Square of ten Foot, as *Carpenters* meaſure their Roofs.

9. You muſt obſerve in taking the Di-

menſions of Tyling, that you meaſure the whole length, that is, as far as the Tiles are laid for your length, and take from the Ridge to the Eves for your Breadth or Depth, and thereby you will have the true Content of Tyling required.

10. When many Hips and Valleys happen in a Roof, they muſt be paid for at— *per* Foot running Meaſure. Beſides all the above Works there comes to the *Bricklayers* Hands the Paving of Kitchens, Cellers, *&c.* with Brick, which Work is meaſured by the ſquare Yard of 9 Foot ſquare.

M. You have given me ample Satisfaction in every Particular, for which I am your moſt obliged, &c.

P. And as I have thus demonſtrated to you the ſeveral ways of meaſuring Superficies and Solids, and the Remarks to be made in taking the Dimenſions of the ſeveral Workman's Works, I will now proceed to lay down divers uſeful Tables, of great uſe in caſting up the Expence of Buildings, *&c.*

TABLE I.

An Inſpectional Table, exhibiting the Price of any number of odd Feet of Brick-work, (or other performed by the Rod) calculated from one Foot, to 34 Feet, (or a half quarter of a Rod) and at any Price from 1*s*. to 10 *l*. the Rod.

The Price of any number of Feet under 34 Feet or half quarter of a Rod.

Price of the Rod	1s.			2s. 6d.			5s.			10s.		
Price of the ¾ Rod	9d.			1s. 10d. 2½			3s. 9d.			7s. 6d.		
Price of the ½ Rod	6d.			1s. 3d.			2s. 6d.			5s.		
Price of the ¼ Rod	3d.			7d. 2			1s. 3d.			2s. 6d.		
Price of the ⅛ Rod	1d. 2q.			3d. 3q.			7d. 2q.			1s. 3d.		
	s.	d.	q	s.	d.	q.	s.	d.	q.	s.	d.	q.
33				0	3	2	0	7	1	1	2	1
32				0	3	2	0	7	0	1	1	3
31				0	3	1	0	6	3	1	1	2
30				0	3	1	0	6	2	1	1	0
29				0	3	0	0	6	1	1	0	2
28				0	3	0	0	6	0	1	0	0
27				0	2	3	0	5	3	0	11	3
26				0	2	3	0	5	2	0	11	0
25				0	2	2	0	5	1	0	10	3
24				0	2	2	0	5	0	0	10	1
23				0	2	1	0	4	3	0	9	3
22				0	2	1	0	4	2	0	9	1
21				0	2	0	0	4	1	0	9	0
20				0	2	0	0	4	1	0	8	2
19				0	1	3	0	3	3	0	7	0
18				0	1	3	0	3	2	0	7	2
17				0	1	2	0	3	2	0	7	0
16				0	1	2	0	3	1	0	6	3
15				0	1	2	0	3	0	0	6	1
14				0	1	1	0	2	3	0	5	3
13				0	1	1	0	2	2	0	5	1
12				0	1	1	0	2	2	0	5	0
11				0	1	0	0	2	1	0	4	2
10				0	1	0	0	2	0	0	4	0
9				0	0	3	0	1	3	0	3	2
8				0	0	3	0	1	2	0	3	0
7				0	0	2	0	1	1	0	2	3
6				0	0	2	0	1	0	0	2	1
5				0	0	1	0	0	3	0	1	3
4				0	0	1	0	0	3	0	1	1
3				0	0	1	0	0	2	0	1	1
2				0	0	0	0	0	1	0	0	3
1				0	0	0	0	0	0	0	0	1

The Price of any Number of Feet under 34 Feet or half quarter of a Rod.

Price of the												
Rod	20*s.*	0*d.*		30*s.*	0*d.*		40*s.*	0		50*s.*	0*d.*	
$\frac{3}{4}$Rod	15	0		22	0		30	0		37	6	
$\frac{1}{2}$Rod	10	0		15	0		20	0		25	0	
$\frac{1}{4}$Rod	5	0		7	6		10	0		12	6	
$\frac{1}{8}$ Rd.	2	6		3	9		5	0		6	3	
	s.	*d.*	*q.*	*s.*	*d.*	*q.*	*s.*	*d.*	*q.*	*s.*	*d.*	*q.*
33	2	4	2	3	6	3	4	9	0	5	11	1
32	2	3	2	3	5	1	4	7	0	5	8	3
31	2	2	3	3	4	1	4	5	2	5	7	0
30	2	1	3	3	2	3	4	3	2	5	4	2
29	2	1	0	3	1	2	4	2	0	5	2	2
28	2	0	0	3	0	0	4	0	0	5	0	0
27	1	11	1	2	11	0	3	10	2	4	10	1
26	1	10	1	2	9	1	3	8	2	4	7	2
25	1	9	1	2	8	0	3	6	2	4	5	1
24	1	8	2	2	6	3	3	5	0	4	3	1
23	1	7	2	2	5	1	3	3	0	4	0	3
22	1	6	3	2	4	0	3	1	2	3	10	3
21	1	6	0	2	3	0	3	0	0	3	9	0
20	1	5	0	2	1	2	2	10	0	3	6	2
19	1	4	0	1	11	0	2	8	0	3	3	0
18	1	3	1	1	10	3	2	6	2	3	2	0
17	1	2	1	1	9	1	2	4	2	2	11	2
16	1	1	2	1	8	1	2	3	0	3	9	3
15	1	0	2	1	6	3	2	1	0	2	7	1
14	0	11	2	1	5	1	1	11	0	2	4	3
13	0	10	3	1	4	0	1	9	2	2	2	3
12	0	10	0	1	3	0	1	8	0	2	1	0
11	0	9	0	1	1	2	1	6	0	1	10	2
10	0	8	0	1	0	0	1	4	0	1	8	0
9	0	7	1	0	10	3	1	2	2	1	6	0
8	0	6	1	0	9	1	1	0	2	1	3	2
7	0	5	2	0	8	1	0	11	0	1	1	0
6	0	4	2	0	6	3	0	9	0	0	11	1
5	0	3	3	0	5	2	0	7	2	0	9	1
4	0	2	3	0	4	0	0	5	2	0	6	3
3	0	2	1	0	3	2	0	4	2	0	5	3
2	0	1	2	0	2	1	0	3	0	0	3	3
1	0	0	3	0	1	0	0	1	2	0	1	3

	Rod	3*l.*	0*s.*	0*d.*	4*l.*	0*s*	0*d.*	5*l.*	0*s.*	0*d.*	10*l.*	0*s.*	0*d.*	
Price of the	$\frac{3}{4}$Rod	2	5	0	3	0	0	3	15	0	7	10	0	
	$\frac{1}{2}$Rod	1	10	0	2	0	0	2	10	0	5	0	0	
	$\frac{1}{4}$Rod	0	15	0	1	0	0	1	5	0	2	10	0	
	$\frac{1}{8}$Rod	0	7	6	0	10	0	0	12	6	1	5	0	
		l.	*s.*	*d.*	*l.*	*s.*	*d.*	*l*	*s.*	*d.*	*l.*	*s.*	*d.*	*q.*
The Price of any number of Feet under 34 or half quarter of a Rod.	33	7	1	2	9	6	0	11	10	2	1	3	9	0
	32	6	10	2	9	2	0	11	5	2	1	2	11	0
	31	6	8	1	8	11	0	11	1	3	1	2	3	2
	30	6	5	1	8	7	0	10	8	3	1	1	5	2
	29	6	3	0	8	4	0	10	5	0	1	0	10	0
	28	6	0	0	8	0	0	10	0	0	1	0	0	0
	27	5	9	3	7	9	0	9	8	1	0	19	4	2
	26	5	6	3	7	5	0	9	3	1	0	18	6	2
	25	5	3	3	7	1	0	8	10	1	0	17	8	2
	24	5	1	2	6	10	0	8	6	2	0	17	0	0
	23	4	10	2	6	6	0	8	1	2	0	16	3	0
	22	4	8	1	6	3	0	7	9	3	0	15	7	2
	21	4	6	0	6	0	0	7	6	0	0	15	0	0
	20	4	3	0	5	8	0	7	1	0	0	14	2	0
	19	4	0	0	5	4	0	6	8	0	0	13	4	
	18	3	9	3	5	1	0	6	4	1	0	12	8	2
	17	3	6	3	4	9	0	5	11	1	0	11	10	2
	16	3	4	2	4	6	0	5	7	2	0	11	2	0
	15	3	1	2	4	2	0	5	2	2	0	10	5	0
	14	2	10	2	3	10	0	4	9	2	0	9	6	0
	13	2	8	1	3	7	0	4	5	3	0	8	11	0
	12	2	6	0	3	4	0	4	2	0	0	8	4	0
	11	2	3	0	3	0	0	3	9	0	0	7	6	0
	10	2	0	0	2	8	0	3	4	0	0	6	8	0
	9	1	9	3	2	5	0	3	0	1	0	6	0	2
	8	1	6	3	2	1	0	2	7	1	0	5	2	2
	7	1	4	2	1	10	0	2	3	2	0	4	7	0
	6	1	1	2	1	6	0	1	10	2	0	3	8	0
	5	0	11	1	1	3	0	1	6	3	0	3	1	2
	4	0	8	1	0	11	0	1	1	3	0	2	3	2
	3	0	6	3	0	9	0	0	11	1	0	1	10	2
	2	0	4	2	0	6	0	0	7	2	0	1	3	0
	1	0	2	1	0	2	0	0	3	3	0	0	7	2

M. What is the Uſe of this Table of Rod Meaſure?

P. To readily find out the *Price* of any odd Feet, under $\frac{1}{4}$ of a Rod, from one Shilling to Ten Pound *per* Rod.

M. Pray explain the Table.

P. I will.

Firſt, At the Head of the Table over each Column you have the Price of one Rod, $\frac{3}{4}$ of a Rod, $\frac{1}{2}$ a Rod, $\frac{1}{4}$ of a Rod, and half quarter of a Rod.

Secondly, In the firſt Column you have the number of odd Feet from 1 to 34, deſcending by 33, 32, 31, *&c.* to one Foot at the bottom, and againſt theſe odd Feet, ſtands in the other Columns the Price, or Value as thoſe odd Feet comes to, at the Rate prefixed over each Column, the uſe of this Table is as following.

The Price *per* Rod agreed on being found at the Head of the Table, juſt under it you have the Price of three quarters, the half, the quarter and half quarter, and underneath them in the ſame Columns, the

Price of any number of odd Feet, from 1 to 34, or half quarter of a Rod.

EXAMPLE I.

At 3 Pound the Rod, what is the Value of three quarters, half a Rod, ¼ of a Rod, half a quarter of a Rod, and 31 Foot.

The Price of the whole Rod	3	0	0
The Three Quarters	2	5	0
The Half Rod	1	10	0
The Quarter of a Rod	0	15	0
The Half Quarter	0	7	6
The Thirty one Feet	0	6	8¼
Sum	5	4	2¼

EXAMPLE II.

At Twenty Shillings the Rod, what comes 29 Feet to?

1. Look at the Head of the Table for Twenty Shillings (the price of the Rod).

2. In the firſt Column find out 29 Feet, and againſt it ſtands, 2 *s.* 1 *d.* 0 which is the price of 29 Feet at 20 *s.* *per* Rod,

and in the like manner you may find that

At	The Rod, that	Feet	will come to	l.	s.	d.	q.
10s.		18		0	0	7	2
5s.		27		0	0	5	3
15s.		19		0	0	10	2
20s.		8		0	0	6	1
40s.		11		0	1	6	0
4l.		16		0	4	6	0
7l.		12		0	5	10	0
10l.		10		0	6	8	0

EXAMPLE III.

At 5*l.* 15*s.* the Rod, what comes 31 Feet to?

In the top of the Table you cannot find 5 *l.* 15 *s.* the Rate of the Rod given, therefore firſt find out, what 31 Feet comes to at 5 *l.* the Rod, which you will find to be 11 *s.* 1 *d.* 3*q.* and ſecondly, find what 31 Feet comes to at 10 *s. per* Rod, which will be found to be 1 *s.* 1*d.* 2*q.* and laſtly, 31 Feet at 5 *s. per* Rod, comes to 6 Pence 3 Farthings, ſo that the whole is as follows.

31 Foot at 5*l*. the Rod is—11 : 1 : 3*q*.
31 Foot at 10*s*. the Rod is— 1 : 1 : 2
31 Foot at 5*s*. the Rod is— 0 : 6 : 3

Sum 12 : 10 : 0

the Value of 31 Feet, at Five Pounds and Fifteen Shillings the Rod.

EXAMPLE IV.

At Nine Pound the Rod, what comes 27 Feet to?

27 Foot at 5*l*. *per* Rod is— 9 : 8 : 1*q*.
27 Foot at 4*l*. *per* Rod is— 7 : 9 : 0

Sum 17 : 5 : 1

The Price of 27 Feet at Nine Pounds *per* Rod.

EXAMLE V.

At Six Pound Seventeen Shillings and Sixpence the Rod, what comes 30 *Feet to?*

	s.	*d.*	*q.*
30 Feet at 5 *l. per* Rod—	10	8	3
30 Feet at 1 *l. per* Rod—	2	1	3
30 Feet at 10 *s. per* Rod—	1	1	0
30 Feet at 5 *s. per* Rod—	0	6	2
30 Feet at 2*s.* 6*d. per* Rod---	0	3	1
Sum	14	9	1

The Price of 30 Feet at 6 *l.* 17 *s.* 6 *d. per* Rod.

M. I underſtand the Uſe of this Table very well, and find that 'twill be of great Service to me in making of Computations, I ſhould be very glad if you would calculate a Table exhibiting the Price of odd Feet, contained in a Square by which Roofing, Flooring, Partitioning and Tiling are meaſured.

P. Such a Table I have already calculated, which ſhall immediately follow.

A Table exhibiting the Price or Value of any number of odd Feet of Tiling, Slating, Roofing, Flooring, *&c.* performed by the Square of Ten Foot, from one Foot, to Twenty Five, or $\frac{1}{4}$ of a Square and at any Price from Half a Crown to Five or Ten Pound the Square ready caſt up.

The Price of any Number of Feet under 25 Feet or $\frac{1}{4}$ of a Square.

The Price of the Square	s		d.	6s.		0d.	7s.		0d.	8s.		0d.
$\frac{3}{4}$ Square	3		9	4		6	5		3	6		0
$\frac{1}{2}$ Square	2		6	3		0	3		6	4		0
$\frac{1}{4}$ Square	1		3	1		6	1		9	2		0
	s.	d.	q.	s.	d.	q.	s.	d.	q.	s.	d.	q.
24	1	2	1	1	5	1	1	7	3	1	11	0
23	1	1	3	1	4	2	1	6	2	1	10	1
22	1	1	0	1	3	3	1	5	3	1	9	0
21	1	0	3	1	3	0	1	5	0	1	8	1
20	1	0	0	1	2	1	1	4	1	1	7	0
19	0	11	2	1	1	2	1	3	2	1	6	1
18	0	10	3	1	0	3	1	2	2	1	5	0
17	0	10	1	1	0	0	1	1	3	1	4	1
16	0	9	2	0	11	1	1	1	0	1	3	0
15	0	9	0	0	11	2	1	0	0	1	2	1
14	0	8	2	0	9	3	0	11	1	1	1	2
13	0	7	3	0	9	0	0	10	2	1	0	1
12	0	7	1	0	8	1	0	9	3	0	11	2
11	0	6	3	0	7	2	0	9	0	0	10	2
10	0	6	0	0	6	3	0	8	1	0	9	2
9	0	5	2	0	6	0	0	7	1	0	8	3
8	0	4	3	0	5	1	0	6	2	0	7	3
7	0	4	0	0	4	2	0	5	3	0	6	3
6	0	3	3	0	3	3	0	5	0	0	5	3
5	0	3	0	0	3	0	0	4	0	0	4	3
4	0	2	1	0	2	1	0	3	1	0	3	3
3	0	1	3	0	1	3	0	2	2	0	3	0
2	0	1	1	0	1	0	0	1	3	0	2	0
1	0	0	3	0	0	2	0	0	3	0	1	0

Price of the

The Price of any number of Feet under 25 or ¼ Square.

Square	9s.	0d.		10s.	0d.		11s	0d.		12s		d.
¾ Square	6	9		7	6		8	3		9	0	
½ Square	4	6		5	0		5	6		6	0	
¼ Square	2	3		2	6		2	9		3	0	
	s.	d.	q.	s.	d.	q.	s.	d.	q.	s.	d.	q.
24	2	1	0	2	4	3	2	7	2	2	10	2
23	2	0	3	2	3	2	2	6	1	2	9	0
22	1	11	3	2	2	1	2	4	3	1	7	2
21	1	10	3	2	1	1	2	3	3	1	6	0
20	1	9	2	2	0	0	2	2	1	1	4	2
19	1	8	2	1	10	3	2	1	0	1	3	0
18	1	7	2	1	8	2	1	11	2	1	1	2
17	1	6	1	1	9	1	1	10	1	1	1	0
16	1	5	1	1	7	1	1	8	3	1	10	2
15	1	4	1	1	6	0	1	7	2	1	9	0
14	1	3	0	1	4	3	1	6	1	1	7	2
13	1	2	0	1	3	2	1	4	3	1	6	0
12	1	1	0	1	2	1	1	3	2	1	4	2
11	1	0	0	1	1	1	1	2	1	1	3	0
10	0	10	3	1	0	0	1	0	3	1	1	2
9	0	9	3	0	10	3	0	11	2	1	0	0
8	0	8	3	0	9	2	0	10	2	0	10	2
7	0	7	2	0	8	1	0	8	2	0	9	0
6	0	6	2	0	7	1	0	7	2	0	7	2
5	0	5	2	0	6	0	0	6	6	0	6	0
4	0	4	1	0	4	3	0	4	2	0	4	2
3	0	3	1	0	3	2	0	3	2	0	2	2
2	0	2	1	0	2	1	0	2	1	0	2	0
1	0	1	0	0	1	2	0	1	2	0	1	2

Price of the

The Price of any number of Feet under 25 or half quarter of a Rod.

Square	13s.		0d.	14s.		0d.	20s.		0d.	30s.		0d.	2l.	0s.	0d.
$\frac{3}{4}$Square	9		9	10		6	15		0	22		6	1	10	0
$\frac{1}{2}$Square	6		6	7		0	10		0	15		0	1	0	0
$\frac{1}{4}$Square	3		3	3		6	5		0	7		6	0	10	0
	s.	d.	q.	s.	d.	q	s.	d.	q	l.	s	q	s.	d.	q.
24	3	1	1	3	3	2	4	9	2	7	2	1	9	7	0
23	3	0	0	3	1	0	4	7	1	6	10	3	9	2	2
22	2	10	0	2	11	2	4	4	3	6	6	0	8	9	2
21	2	9	0	2	10	0	4	2	2	6	3	3	8	5	0
20	2	7	0	2	8	2	4	0	0	6	0	0	8	0	0
19	2	5	3	2	7	0	3	9	2	5	8	1	7	7	0
18	1	3	0	2	5	0	3	7	1	5	4	3	7	2	2
17	1	2	2	2	3	2	3	4	3	5	1	0	6	9	2
16	1	0	2	2	2	0	3	2	2	4	9	3	6	5	0
15	1	11	1	2	0	0	3	0	0	4	6	0	6	0	0
14	1	10	0	1	10	2	2	9	2	4	2	1	6	7	0
13	1	8	0	1	9	0	2	7	1	3	10	3	5	2	2
12	1	6	3	1	7	2	2	4	3	3	7	0	4	9	2
11	1	5	1	1	6	0	2	2	2	3	3	3	4	5	0
10	1	3	2	1	4	2	2	0	0	3	0	0	4	0	0
9	1	2	1	1	2	2	1	9	2	2	8	1	3	7	0
8	1	0	2	1	1	0	1	7	1	2	4	3	3	2	2
7	0	10	3	0	11	2	1	4	3	2	1	0	2	9	2
6	0	8	2	0	10	0	1	2	2	1	9	3	2	5	0
5	0	7	3	0	8	0	1	0	0	1	6	0	2	0	0
4	0	5	2	0	6	2	0	9	2	1	2	1	1	7	0
3	0	4	3	0	5	0	0	7	1	0	10	3	1	2	2
2	0	3	1	0	3	2	0	4	3	0	7	0	0	9	2
1	0	1	3	0	1	2	0	2	2	0	3	3	0	5	0

M. Pray explain to me the uſe of this Table.

P. I will.

Firſt, (As in the former) at the Head of the Table you have the Price of one Square, ¾ of a Square, ½ a Square, and ¼ of a Square placed over each Column, calculated from Five Shillings the Square, to Forty Shillings the Square, and by Addition to Five Pound, Ten Pound, *&c. per* Square, as will appear hereafter.

Secondly, In the firſt Column you have any number of odd Feet under 25, and in the other Columns, is placed the Price or Rate as any number of odd Feet under 25 comes to, according to the Rate or Price at the Head of the Column.

The Uſe of the Table follows.

The Price agreed on, being found at the Head of the Table, underneath it you have the Price of ¼ of a Square ½ a Square and ¾ of a Square, and againſt the odd Feet, their reſpective Prices.

I will illuſtrate the Uſe by Examples.

EXAM-

EXAMPLE I.

At Twelve Shillings the Square, what is the Price of ¾ of a Square, ½ a Square ¼ of a Square and 20 Feet.

	l.	*s.*	*d.*	
The Square is at ----	0	12	0	0*q.*
The 3 Quarters is ----	0	9	0	0
The half — —	0	6	0	0
The Quarter— -----	0	3	0	0
The 20 Feet --- ---	0	1	4	2
Sum	0	19	4	2

EXAMPLE II.

At 13*s.* the Square, what comes 24 Feet to?

Againſt 24 Feet in the firſt Column, and under 13 *s.* at the Head of the Table, ſtands 3 *s.* 1 *d.* ¼, which is the Price or Value of 24 Feet, at 13 *s. per* Square.

And after the ſame manner you may find that

At s.	The Square, that	will come to l.	s.	d.	q.
5	21	0	1	0	3
7	17	0	1	1	3
9	11	0	1	0	0
11	9	0	0	11	2
13	16	0	1	0	2
20	20	0	4	0	0
40	21	0	8	5	0

And the like for any other Rate under 25 Feet or ¼ of a Square.

EXAMPLE III.

At One Pound Sixteen Shillings the Square, what comes 22 Feet to?

In the upper part of the Table, you cannot find Thirty Six Shillings, the Rate given, but you may find Thirty Shillings in one Column, and Six Shillings in another;

	s.	*d.*	*q.*
22 Foot at 30 *s.* is ----	6	6	0
and 22 Foot at 6 *s.* is ----	1	3	3
So that 22 Feet at 36 *s. per* Square comes to --- ---	7	9	3

EXAM-

EXAMPLE IV.

At 2 *l.* 12 *s.* the Square what comes 21 Feet to?

	s.	*d.*	*q.*
21 Feet at 40*s.* the Square is	8	5	0
21 Feet at 12*s.* the Square is	1	6	0
21 Feet at 52*s.* the Square is	9	11	0

EXAMPLE V.

At 3 *l.* 19 *s.* the Square what comes 12 Feet to?

	s.	*d.*	*q.*
12 Foot at 40*s.* the Square is	4	9	2
12 Foot at 30*s.* the Square is	3	7	0
12 Foot at 9*s.* the Square is	1	1	0
12 Feet at 3 *l.* 19*s.* 10*d.* is	9	5	2

EXAMPLE VI.

At 2*l.* 12*s.* and 6*d.* *per* Square, what doth 24 Feet come to?

	s.	*d.*	*q.*
24 Feet at 40*s.* is	9	7	0
24 Feet at 10*s.* is	2	4	3
24 Feet at 5*s.* is 1*s.* 2*d.* 1			
whoſe half is --- ---	0	7	½
24 Feet at 2*l.* 12*s.* 6*d.* is	12	6	3½

and the like for any other Rate required.

M. I wonder

M. I wonderfully approve of theſe Tables, pray have you any other by you?

P. Yes, I have divers others, but for the preſent, I ſhall inſert but two more, the one ſhewing the Value of odd Feet in the Yard Meaſure, and the other a Table reduceing the Thickneſs of any Brick Wall, to the Standard Thickneſs of one Brick and half.

An inſpectional Table, exhibiting what any number of odd Feet in a Superficial or Solid Yard, comes unto; for any Price by the Yard from One Farthing *per* Yard to Ten Pound, *&c.*

Feet Superficial			1			2			3		
			s.	d.	q.p's.	s.	d.	q.pts	s.	d	q.pts
The Price of the Yard in	Farthings	1	0	0	0,11	0	0	0,22	0		0,33
		2	0	0	0,22	0	0	0,44	0	0	0,67
		3	0	0	0,33	0	0	0,66	0	0	1,00
	Pence	1	0	0	0,44	0	0	0,89	0	0	1,33
		2	0	0	0,89	0	0	1,78	0	0	2,66
		3	0	0	1,33	0	0	2,67	0	1	0,00
		4	0	0	1,77	0	0	3,54	0	1	1,33
		5	0	0	2,22	0	1	1,43	0	1	2,66
		6	0	0	2,66	0	1	2,32	0	2	0,00
		7	0	0	3,10	0	1	3,21	0	2	1,33
		8	0	0	3,55	0	2	0,10	0	2	2,66
		9	0	1	0,00	0	2	0,99	0	3	0,00
		10	0	1	0,44	0	2	1,88	0	3	1,33
		11	0	1	0,89	0	2	2,77	0	3	2,66
	Shillings	1	0	1	1,33	0	2	2,66	0	4	0,00
		2	0	2	2,66	0	5	1,33	0	8	0,00
		3	0	4	0,00	0	8	0,88	1	0	0,00
		4	0	5	1,33	0	10	2,66	1	4	0,00
		5	0	6	2,66	1	11	1,33	1	8	0,00
		6	0	8	0,00	1	14	0,00	2	0	0,00
		7	0	9	1,33	1	6	2,66	2	4	0,00
		8	0	10	2,66	1	9	1,33	2	8	0,00
		9	1	0	0,00	2	10	0,00	3	0	0,00
		10	1	1	1,33	2	12	2,66	3	4	0,00
	Pounds	1	2	2	2,67	4	5	1,33	6	8	0,00
		2	4	5	1,33	8	10	2,67	13	4	0,00
		3	6	8	0,00	13	4	0,00	20	0	0,00
		4	9	10	2,67	17	9	1,33	26	8	0,00
		5	12	1	1,33	23	2	2,67	33	4	0,00
Solid Feet			3			6			9		

An Inſpectional Table, exhibiting what any number of odd Feet in a Superficial or Solid Yard comes unto; for any Price by the Yard, from One Farthing *p r* Yard to Ten Pound, *&c.*

The Price of the Yard in		4			5			6		
		s.	*d.*	*q.pts.*	*s.*	*d.*	*q.pts.*	*s.*	*d.*	*q.pts.*
Farthings	1	0	0	0,44	0	0	0,55	0	0	0,67
	2	0	0	0,88	0	0	1, 0	0	0	1,33
	3	0	0	0,33	0	0	1.65	0	0	2,00
Pence	1	0	0	1, 7	0	0	2,22	0	0	2,66
	2	0	0	3,54	0	1	0,44	0	1	1,32
	3	0	1	1,32	0	1	2,68	0	2	0,00
	4	0	1	3,10	0	2	0,88	0	2	2,66
	5	0	2	0,87	0	2	3,10	0	3	1,33
	6	0	2	2,64	0	3	1,32	0	4	0,00
	7	0	2	0,42	0	3	3,54	0	4	2,66
	8	0	3	2,20	0	4	1,76	0	5	1,33
	9	0	3	0,98	0	4	3,98	0	6	0,00
	10	0	4	1,76	0	5	2,20	0	6	2,66
	11	0	4	3,53	0	6	0,42	0	7	1,33
Shillings	1	0	5	1,33	0	6	2,66	0	8	0,00
	2	0	10	2,66	1	1	1,33	1	4	0,00
	3	1	4	0,00	1	8	0, 0	2	0	0,00
	4	1	9	1,33	2	2	2,66	2	8	0,00
	5	2	2	2,66	2	9	1,33	3	4	0,00
	6	2	8	0,00	3	4	0,00	4	0	0,00
	7	3	1	1,33	3	10	2,66	4	8	0,00
	8	3	6	2,66	3	5	1,33	5	4	0,00
	9	4	0	0,00	5	0	0,00	6	0	0,00
	10	4	5	1,33	5	6	2,66	6	8	0,00
Pounds	1	8	10	2,67	11	1	1,33	13	4	0,00
	2	17	9	1,33	22	2	2,67	26	8	0,00
	3	26	8	0,00	33	4	0,00	40	0	0,00
	4	35	6	2,67	44	5	1,33	53	4	0,00
	5	44	5	1,33	55	6	2,67	66	8	0,60
Feet Solid		12			15			18		

An Inſpectional Table, exhibiting what any number of odd Feet in a Superficial or Solid Yard, comes unto; for any Price by the Yard from One Farthing *per* Yard to Ten Pound, *&c.*

Feet Superficial		7			8			A Yard		
		s.	d.	q.pts.	s.	d.	q.pts.	s.	d.	q.pts.
Farthings	1	0	0	0,77	0	0	0,88	0	0	1,00
	2	0	0	1,54	0	0	1,76	0	0	2,00
	3	0	0	2,31	0	0	2,66	0	0	3,00
Pence	1	0	0	3,10	0	0	3,55	0	1	0,00
	2	0	1	2,20	0	1	3,10	0	2	0,00
	3	0	2	1,30	0	2	2,65	0	3	0,00
	4	0	3	0,40	0	3	2,20	0	4	0,00
	5	0	3	3,50	0	4	1,75	0	5	0,00
	6	0	4	2,60	0	5	1,30	0	6	0.00
	7	0	5	1,70	0	6	0,85	0	7	0,00
	8	0	6	0,80	0	7	0,40	0	8	0,00
	9	0	6	3,90	0	8	0,95	0	9	0,00
	10	0	7	3,00	0	9	0,50	0	10	0,00
	11	0	8	2.10	0	10	0,05	0	11	0,00
Shillings	1	0	6	1,33	0	10	2,66	1	0	0,00
	2	1	9	2,67	1	9	1 33	2	0	0,00
	3	2	4	0,00	2	8	0,00	3	0	0,00
	4	3	1	1,33	3	6	2,67	4	0	0,00
	5	3	10	2,67	4	5	1,33	5	0	0,00
	6	4	8	0,00	5	4	0,00	6	0	0,00
	7	5	5	1,33	6	2	2,67	7	0	0,00
	8	6	2	2,67	7	1	1,33	8	0	0,00
	9	7	0	0,00	8	0	0,00	9	0	0,00
	10	7	9	1,33	8	10	2,66	10	0	0,00
Pounds	1	15	6	2,67	17	9	1,33	20	0	0,00
	2	31	1	1,33	35	6	2,67	40	0	0,00
	3	46	8	0,00	53	4	0,00	60	0	0,00
	4	62	2	2,67	71	1	1,33	80	0	0,00
	5	77	9	1,33	88	10	2,66	100	0	0,00
Feet Solid		21			24			A Yard Cubical		

M. The Uſe of this Table doth not appear to be ſo plain as the preceding.

P. Yes it is, as you ſhall find by the Explanation and Uſe.

Firſt, At the Head of the Table are the odd Feet contained in a Yard Superficial, beginning at one Foot, and ending at a Yard.

At the bottom of the Table you have the number of Feet in a Cubical Yard, numbred by 3, 6, 9, *&c.* to a Yard Solid.

In the firſt Column towards the Left-Hand, is placed the price of a Yard from one Farthing to 5*l. per* Yard, and in the other Columns under the odd Feet, is placed the Price in Shillings, Pence, Farthings, and hundred parts of a Farthing, as any number of odd Feet comes to.

The Uſe of this ſhall be made plain by Examples.

EXAMPLE I.

At Eight Pence the Yard, what comes 6 Feet to?

Look for 8 Pence in the firſt Column, and under 6 Feet in the Angle of meeting you find 0*s.* 5*d.* 1*q.* 33, that is 00*s.* 5*d.* 1 Farthing, and 33 hundred parts of a Farthing, which is the Price or Value of 6 Feet, at 8 Pence the Yard, Superficial, and in like manner, may be found that at

3 Farthings	The Yard, that	7	Foot will come to,	0 : 0 : 2,31
3 Pence		5		0 : 1 : 2,66
9 Pence		4		0 : 3 : 0,98
7 Shillings		6		4 : 8 : 0,00
4 Pound		8		71 : 1 : 1,33

And the like of any other.

EXAMPLE II.

At 5 Shillings and 4 Pence Half-penny *per* Yard, what comes 8 Foot to?

	s.	*d.*	*qpts.*
8 Foot at 5 Shillings is	4	5	1,33
8 Foot at 4 Pence is	0	3	2,20
8 Foot at Half Penny is	0	0	1,76
So that 8 Feet, at 5 Shillings 4 Pence 2*q.* *per* Yard is,	4	9	1,29

EXAMPLE III.

At Three Pounds Seven Shillings Nine Pence Half-penny the Yard, what comes 7 Foot ½ to?

	l.	*s.*	*d.*	*q.*
7 Feet at 3*l. per* Yard is ----	2	6	8	0
Half a Foot at 3*l. per* Yard is ----	0	3	4	0
7 Feet at 7 *s. per* Yard is ---	0	05	5	1,33
Half a Foot at 7*s. per* Yard is —	0	0	4	2
7 Feet at 9*d. per* Yard is ---	0	0	6	3,90
7 Feet at Half-Penny *per* Yard is	0	0	0	1,54
Half a Foot at ½ Penny *per* Yard is	0	0	0	0,11
7 Feet at 3*l.* 7*s.* 9*d.* 2*q.* the Yard comes to ---	2	16	5	2,88

EXAM-

EXAMPLE IV.

At 2*s.* and 7*d.* the Cubical Yard, what comes 18 Feet to?

Find 18 at the bottom of the Table, and 2*s.* in the firſt Column, and in the Angle of meeting, ſtands 1*s.* 4*d.* 0,00*q.pts.* likewiſe againſt 7*d.* and over 18. in the Angle of meeting you find 0*s.* 4*d.* 2,66*q.pts.* which added to the other makes 1*s.* 8*d.* 2*q.*66, which is the Price of 18 Feet at 2*s.* 7*d.* *per* Yard ſolid.

EXAMPLE V.

At 12*s*. 5*d*. 2*q*. the Yard Cubical, what comes 20 Feet to?

Firſt, Becauſe we cannot find 20 at the bottom of the Table take it at twice, *viz.* at 18, and $\frac{2}{3}$ of three

	l.	*s.*	*d.*
18 Feet at 10*s*. the Yard comes to ---	6	8	0
18 Feet at 2*s*. the Yard is --- —	1	4	0
18 Feet at 5*d*. the Yard is --- ---	0	3	1,33
18 Feet at Half-Penny *per* Yard is	0	0	1,33
2 Feet at 10*s*. the Yard is $\frac{2}{3}$ of 3 Feet	0	8	2 almoſt
2 Feet at 2*s*. the Yard is $\frac{2}{3}$ of 3 Feet	1	4	0
2 Feet at 5*d*. the Yard is $\frac{2}{3}$ of 3 Feet	0	0	0,73
2 Feet at 2*q*. *per* Yard $\frac{2}{3}$ is ---	0	0	0,14
The Price of 20 Feet at 12*s*. 5*d*. 2*q*. the Yard Cubical ---	10	4	1,53

An

An Inſpectional Table, reducing Brickwork of any Thickneſs, to the Standard Thickneſs of one Brick and Half.

		½ Brick			1 Brick			1 ½ Brick			2 Bricks.		
		R.	Q.	F.	R.	Q.	F	R.	Q.	F.	R.	Q.	F
	1 Quarter	0	0	22	0	0	45	0	1	0	0	1	22
	2 Quarter	0	0	45	0	1	22	0	2	0	0	2	45
	3 Quarter	0	1	0	0	2	0	0	3	0	1	0	0
Rods contained upon the Superficial Meaſure of the Wall.	1	0	1	22	0	2	45	1	0	0	1	0	22
	2	0	2	45	1	1	22	2	0	0	2	2	45
	3	1	0	0	2	0	0	3	0	0	4	0	0
	4	1	1	22	2	2	45	4	0	0	5	1	22
	5	1	2	45	3	1	22	5	0	0	6	2	45
	6	2	0	0	4	0	0	6	0	0	8	0	0
	7	2	1	22	4	2	45	7	0	0	9	1	22
	8	2	2	45	5	1	22	8	0	0	10	2	45
	9	3	0	0	6	0	0	9	0	0	12	0	0
	10	3	1	22	6	2	45	10	0	0	13	1	22
	11	3	2	45	7	1	22	11	0	0	14	2	45
	12	4	0	0	8	0	0	12	0	0	16	0	0
	13	4	1	22	8	2	45	13	0	0	17	1	22
	14	4	2	45	9	1	22	14	0	0	18	2	45
	15	5	0	0	10	0	0	15	0	0	20	0	0
	16	5	1	22	10	2	45	16	0	0	21	1	22
	17	5	2	45	11	1	22	17	0	0	22	2	45
	18	6	0	0	12	0	0	18	0	0	24	0	0
	19	6	1	22	12	2	45	19	0	0	25	1	22
	20	6	2	45	13	1	22	20	0	0	27	2	45
	21	7	0	0	14	0	0	21	0	0	28	0	0

An Inſpectional Table, reducing Brickwork of any Thickneſs, to the Standard Thickneſs of one Brick and Half.

Rods contained upon the Superficial Meaſure of the Wall.	2 ½ Bricks			3 Brick			3 ½ Bricks			4 Bricks		
	R.	Q.	F.	R	Q.	F.	R.	Q.	F.	R.	Q.	F.
1 Quarter	0	1	45	0	2	0	0	2	22	0	2	45
2 Quarter	0	3	22	1	0	0	1	0	45	1	1	22
3 Quarter	1	1	0	1	2	0	1	3	0	2	0	0
1	1	2	45	2	0	0	2	1	22	2	2	45
2	3	1	22	4	0	0	4	2	45	5	1	22
3	5	0	0	6	0	0	7	0	0	8	0	0
4	6	2	45	8	0	0	9	1	22	10	2	45
5	8	1	22	10	0	0	11	2	45	12	1	22
6	10	0	0	11	0	0	14	0	0	16	0	0
7	11	2	45	14	0	0	16	1	22	18	2	45
8	13	1	22	16	0	0	18	2	45	21	1	22
9	15	0	0	18	0	0	21	0		24	0	0
10	16	2	45	20	0	0	23	1	22	26	0	45
11	18	1	22	22	0	0	25	2	45	29	1	22
12	20	0	0	24	0	0	28	0	0	32	0	0
13	21	2	45	26	0	0	30	1	21	34	2	45
14	23	1	22	28	0	0	32	2	45	37	1	22
1	25	0	0	30	0	0	35	0	0	40	0	0
16	26	2	45	32	0	0	37	1	22	42	2	45
17	28	1	22	34	0	0	39	2	45	45	1	22
18	30	0	0	36	0	0	42	0	0	48	0	0
19	31	2	45	38	0	0	44	1	22	50	2	45
20	33	1	22	40	0	0	46	2	45	53	1	22
21	35	0	0	42	0	0	49	0	0	56	0	0

An Inſpectional Table, Reducing Brick-work of any Thickneſs to the Standard Thickneſs of one Brick and Half.

Rods contained upon the Superficial Meaſure of the Wall.

	4 ½ Bricks			5 Bricks			5 ½ Bricks		
	R.	Q.	F.	R.	Q.	F.	R.	Q.	F.
1 Quarter	0	3	0	0	3	22	0	34	45
2 Quarter	1	2	0	1	2	45	1	3	22
3 Quarter	2	1	0	2	2	0	2	3	0
1	3	0	0	3	1	22	3	2	45
2	6	0	0	6	2	45	7	1	22
3	9	0	0	10	0	0	11	0	0
4	12	0	0	13	1	22	14	2	45
5	15	0	0	16	2	45	18	1	22
6	18	0	0	20	0	0	22	0	0
7	21	0	0	23	1	22	25	2	45
8	24	0	0	26	2	45	29	1	22
9	27	0	0	20	0	0	33	0	0
10	30	0	0	33	1	22	36	2	45
11	33	0	0	36	2	45	40	1	22
12	36	0	0	40	0	0	44	0	0
13	39	0	0	43	1	22	47	2	45
14	42	0	0	46	2	45	51	[illegible]	22
15	45	0	0	50	0	0	55	0	0
16	48	0	0	53	1	22	58	2	45
17	51	0	0	56	2	43	62	1	22
18	54	0	0	60	0	0	66	0	0
19	57	0	0	63	1	22	69	2	45
20	60	0	0	66	2	45	73	1	22
21	63	0	0	70	0	0	77	0	0

M. Pray explain this Table to me.

P. In the head of the Table is placed the Thickneſs of the Wall in Bricks and half Bricks from half a Brick in thickneſs to ſix Bricks thick: In the firſt Column is placed the number of Rods, contained in any Wall, from $\frac{1}{4}$ of a Rod to 21 Rod, and againſt thoſe numbers, in the other Columns, ſtands the quantity of Brickwork in Rods, Quarters and Feet, as the Wall contains, at any of thoſe Thickneſſes at the Head of the Table; a few Examples will make it plain.

EXAMPLE I.

Suppoſe a Wall upon the Superficies contain Ten Rod, and its Thickneſs be Three Bricks and Half; how many Rod is in that Wall at the Standard Thickneſs of one Brick $\frac{1}{2}$?

Find 10 Rod in the firſt Column, and under $3\frac{1}{2}$ Bricks at the Head of the Table, in the Angle of Meeting is 23,1,22. which is 23 Rod, 1 Quarter and 22 Feet, which is the true quantity required at the Standard Thickneſs of $1\frac{1}{2}$ Brick thick.

And in the like manner by the Table you may find, that if the Superficial Content of a Wall be 15 Rod; if that Wall be in Thickneſs

		r.	q.	f.	
½	Brick, it will contain being reduced to the Standard Thickneſs of one Brick and half	5	0	0	Contents requir'd.
1		10	0	0	
1½		15	0	0	
2		20	0	0	
2½		25	0	0	
3		30	0	0	
3½		35	0	0	
4		40	0	0	
4½		45	0	0	
5		50	0	0	

EXAMPLE II.

If a Wall be 4 Bricks ½ thick, and contain upon the Superficies 20 Rod, how many Rod of Brickwork is in that Wall at the Standard Thickneſs.

Find 20 in the firſt Column, and under 4½ Bricks ſtands 60 *r.* 00 *q.* 00 *f.* which is 60 Rod, 00 Quarters, 00 Feet, the Content requir'd, and in like manner if a Wall

			Brick		r.	q.	f.
Contain	12	Rod upon the Superficies	3½	Thick, it will contain being reduced	28	0	0
	16		2½		26	2	45
	21		50		70	0	00

EXAM-

EXAMPLE III.

There is a Wall whoſe Superficies meaſures 12 Rod 3 Quarters, and is 4 Brick thick, how many Rod of Work is in that Wall at Standard Thickneſs. r. q. f.

12 Rod at 4 Bricks thick is— 32 : 0 : 0
3 Quarters at 4 Brick is —02 : 0 : 0

So that the Wall contains—34 : 0 : 0

EXAMPLE IV.

The Superficial Content of a Wall is 10 *Rod, and* 9½ *Bricks thick, how many Rod of Work, is in that Wall?*

Becauſe the Table do not extend to 9½ Bricks at the Head, therefore take it at at twice.

10 Rod at 5 Brick thick is— 33 : 1 : 22
10 Rod at 4½ Brick thick is —30 : 0 : 00
10 Rods at 9½ Brick thick is--63 : 1 : 22

And thus much for the Uſe of the Tables.

I ſhall now proceed to demonſtrate unto you the Proportions, that all ſorts of Rooms in a Building ought to bear one to another, in regard to their length, breadth, and height, as alſo of Gates, Doors, Windows, Chimneys, Stairs and Stair-Caſes, and then conclude for the preſent.

Of GALLERIES.

M. What Proportion ſhould the length of a Gallery have to its breadth?

P. Not leſs than five times its breadth, nor more than eight.

M. What height ought Galleries to have?

P. Their height ought to be equal to their breadth.

M. What is the beſt Aſpect for Galleries?

P. The North, becauſe its light is beſt for Paintings, *&c.* which they are generally adorn'd with.

M. Is it not poſſible to make Galleries too narrow or too wide?

P. Yes, and therefore their breadth ſhould never be leſs than ſixteen Feet, nor to exceed twenty four Feet.

Of HALLS.

M. What is to be obſerved in the Proportion of Halls?

P. That their length be not leſs than twice their breadth, nor to exceed three times.

M. Of what height muſt Halls be?

P. If their Ceilings are flat, their height may be two Thirds of their breadth, and if the Ceiſing be arched, the height may be $\frac{5}{6}$ of its breadth.

Of CHAMBERS.

M. What Situation is beſt for Chambers of Delight?

P. The *Eaſt*, provided that any other hath not a better Proſpect.

M. What Proportion ought a good Lodging-Chamber to have?

P. That its lenghth be never more than its breadth and half breadth, nor leſs than the breadth its ſelf, *viz.* exactly ſquare.

M. Of What height ought Chambers to be?

P. The height of Chambers of the firſt

Story, not leſs than $\frac{2}{3}$ of their breadth, the ſecond Story $\frac{11}{12}$ of the firſt, and the third Story $\frac{3}{4}$ of the ſecond.

Of INNER-DOORS.

M. Of what breadth may Doors be made in large Buildings?

P. Doors in large Buildings muſt be always in proportion to the place wherein they ſtand, their breadth muſt not be leſs than three Feet, nor more than ſix Feet, and their height always equal (at leaſt) to double their breadth, or two Diameters; Inner-Doors in ſmall Buildings muſt never be leſs than two Feet and half in breadth and in height ſix Feet.

Of WINDOWS.

M. What are the principal Things to be obſerv'd in Windows?

P. Firſt, Their Magnitude.

Secondly, Their Number; And,

Thirdly, The bigneſs of the Room, that they are to enlighten; for its poſſible to make Rooms as well too light, as too dark.

The height of Windows of the firſt Story, may be two Diameters, and where neceſſary, two Diameters and $\frac{1}{4}$, $\frac{1}{3}$, or $\frac{1}{2}$. The height of Windows in the ſecond and third Stories to be in the ſame Proportion as that of Chambers.

Of the placing of DOORS *and* WINDOWS.

Firſt, Let all the Doors (if poſſible) be placed right oppoſite againſt one another, ſo that a clear View may be had throughout the whole Houſe, which is both graceful and convenient.

Secondly, Place your Windows in ſuch order that thoſe on the right of the Door be equal to thoſe on the left, and thoſe in the Stories above, to be directly over thoſe below.

Thirdly, 'Tis of great Service as well as Ornament, to turn Arches over Doors and Windows, to diſcharge the Weight as lies over them.

Laſtly, Suffer not Windows to be placed too near the Angles of a Building, but leave the Coyn as large as may be with Conveniency, for thoſe Coyns are the very Nerves and Support of the whole Building.

Of CHIMNEYS.

The ſeveral ſorts of Chimneys, are thoſe of the Hall, the Parlour, the Chamber, the Study, and Kitchen.

Firſt, Hall Chimneys, ought to be in the clear between Jaum, and Jaum, 6 or 7 Feet, and in large Buildings 8 Feet. The height of the Mantle-tree to be about 5 Feet, and the Projecture of the Jaums about 2 Feet 9 Inches, or 3 Feet.

Secondly, Parlour or Chamber Chimneys, not to exceed ſix Feet between Jaum and Jaum, their height to be about 4 Feet or 4 Feet and half, and Projecture about 2 Feet or 2 and half.

Thirdly, Chimneys in Studies, *&c.* their breadth to be 5 Feet at moſt, height 4 Feet, and depth of the Jaums 2 Feet.

Of the FUNNELS *of* CHIMNEYS.

The Funnels of Chimneys muſt be carried through the Roof at leaſt 5 or 6 Feet, otherwiſe the Wind will repulſe the Smoak. Funnels of Chimneys ſhould not be too wide nor too narrow, if too wide, the Wind will drive back the Smoak, and if too narrow, the Smoak is repulſed by the Wind and beaten back alſo. Therefore great Chimneys may be made about 14 or 15 Inches Square, and for Chamber Chimneys, *&c.* about 1 Foot ſquare, or ſcarce ſo much.

Of STAIR-CASES.

Great care ought to be taken in the placeing of the Stair-Caſe of any Building, but commonly the Stairs are placed in the Angle, Wing or middle of the Front.

To every Stair-Caſe, are required three Openings.

Firſt, The Door leading to them.

Secondly, The Window or Windows as gives Light to them, And

Thirdly, Their Landing.

Firſt, The Door leading to a Stair-Caſe, ſhould be ſo placed that moſt of the Building may be ſeen before you come at the Stairs, and in ſuch a manner, that it may be eaſy for any Perſon to find out.

Secondly, For the Windows, if there is but one, it muſt be placed in the middle of the Stair-Caſe, that thereby the whole may be enlightned; but if more than one Window, place one in each Story.

Thirdly, The Landing of Stairs, ſhould be large and ſpacious for the convenient Entrance into the Rooms: In a word, Stair-Caſes, ſhould be ſpacious, light, and eaſy in aſcent. The height of large Steps, muſt never be leſs than 6 Inches, nor more than 7 Inches and half.

The breadth of Steps ſhould be never leſs than 10 Inches, nor more than 15 Inches.

In making of Stair-Caſes this Rule ſhould be obſerved, that the number of Steps at every Landing be odd, and not even, for thereby, when you begin to aſcend with your right Foot firſt (as all Perſons generally do) you will end with the ſame Foot alſo.

P. Theſe ſeveral Inſtructions which you have ſo kindly deliver'd, obliges me to be careful in obſerving of the ſame; and as you have been ſo very communicative to me, in the ſeveral parts hereof, whereby I am greatly improved; I hope you'l excuſe me if I ſhould trouble you with ſome few other Queſtions, relating to this beautiful Science, of Architecture.

M. Sir, 'Tis my greateſt Pleaſure to oblige all Lovers of Art, and am never more pleaſed than when I can be of ſervice to ſuch as your ſelf, who naturally delight in the Beauties of true Proportions?

P. Sir, I am very much obliged to you for the ſame. And as you are pleaſed to give me that Liberty, pray inform me what Arts in general I ought to be well qualified with, ſo as to be a complete Architect.

M. Beſides the Proportions that I have here demonſtrated, which you are now well acquainted with, and what ought to be firſt read, and well underſtood by every young Student; there are many others, of very great Uſe and Beauty, that abſolutely depend upon Arithmetick, Geometry, Plain Trigonometry, *&c. which I will demonſtrate to you in thoſe other Lectures hereafter, when you have well conſidered of what I have already deliver'd. For before I can proceed to their Demonſtrations, I muſt be certain, that you are well qualified herein. And when ever you meet with any part that at firſt reading appears any thing difficult, paſs it over, and proceed to the next, and ſo on till you have gone through the ſeveral Operations, at leaſt ſix times, during which all thoſe Parts that at firſt View appeared difficult, will become familiar and eaſy.*

P. I thank you, Sir, and will truly obſerve your Advice, but before you depart, pray inform me where I can be furniſhed with proper Inſtruments for my Purpoſes, and what they are.

M. The moſt exact, and reaſonable Mathematical Inſtrument Maker, that I can recommend you to, is the ingenious Mr. Benjamin Scot, *at the* Mariner *and* Globe, *againſt* Exeter-Change *in the* Strand, *London.*

And the Inſtruments proper for your Purpoſe are, firſt, a complete Caſe, conſiſting of two pair of Compaſſes, of which one Pair muſt be made with its Legs to ſcrew out, at ſuch Times when you deſire to deſcribe an Arch or Circle (with another Point) either of Black-lead or Ink.

A Drawing-Pen, with a Protracting-Pin, therein, a Plain Scale, with divers Scales of equal Parts and Chords, a Protractor, and Sector.

Secondly, A Drawing Table, and Tea Square, with good Paper, Ink, Black-lead and Camel-Hair Pencils.

Thirdly, Two or Three larger pair of Compaſſes, than thoſe of the Caſe, and a Parallel Ruler.

P. And are thoſe fully ſufficient for the Execution of my whole Studies?

M. No, but for your firſt ſetting out, they are ſufficient.

P. Pray, what may the other Inſtruments be called, and to what Uſe are they apply'd.

M. The other Inſtruments are ſuch that you will have occaſion for when you come to the ſetting out and Surveying of Buildings, as the plain Table, Theodolite, Levels, &c. *and if your Genius leads you to the Pleaſure and Study of Dialling, you muſt then be furniſhed with the beſt kinds of Quadrants, as Suttons, Gunters,* &c. *univerſal Ring-Dials,* *large Sectors, Globes,* &c. *and eſpecially Mr.* Scot's, *new Mathematical Inſtrument, which ſolves by Inſpection, all kinds of Queſtions relating to Numbers, Sines and Tangents, as well as all the moſt uſeful Parts of Aſtronomy, as the Sun's Amplitude, Declination, right Aſcenſion, Riſing and Setting, Place in the* Zodiack, *Equation of Time,* &c. *to every Day in the Year for ever. But before you attempt the Study of theſe laſt and moſt noble Parts; ſee that you are firſt well acquainted with the Principles here laid down, which I hope to find at my Return from Abroad, when I will then proceed to the Demonſtrations of other Lectures, as they ought to be read by every one, who are firſt acquainted with the Beauties of thoſe Proportions, that are contained in the preceeding Lectures hereof.*

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